MOTOR AGE

Vol. XXX
No. 15

CHICAGO, OCTOBER 12, 1916

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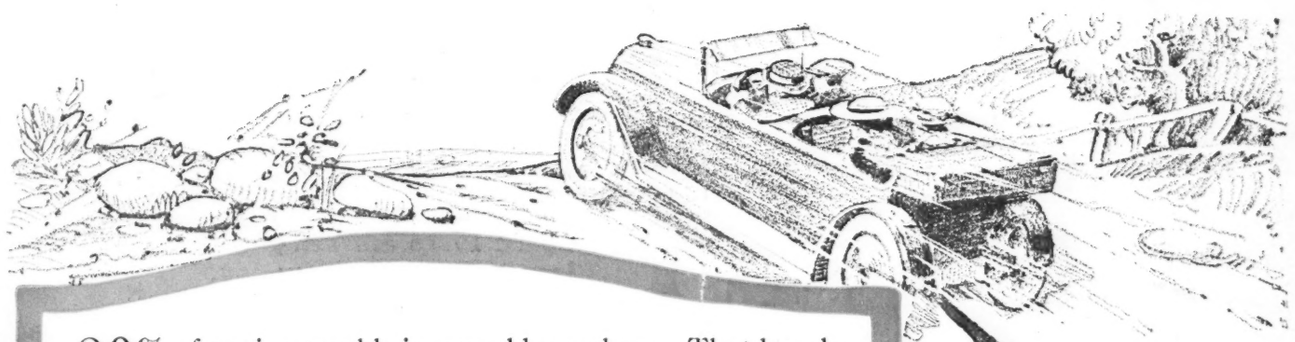

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MOTOR AGE

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ANNOUNCEMENTS

Next week's Motor Age will reveal what motorists may find in the line of wearing apparel for winter motoring. New modes in clothing will be illustrated and described.

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MOTOR AGE

Comfort *is the* Keynote *of the* New Cars

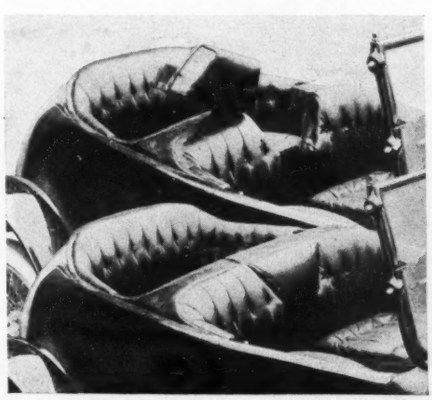
By Darwin S. Hatch

COMFORT seems to be the watchword of car designers and manufacturers in the development of their products for the 1917 season. If the present worthy tendency toward making motoring easy continues, as it is to be hoped it will continue, the motorist may sink back into the cushions of his car with the same sigh of complete comfort that he drops into his easy chair, with pipe and book and slippered feet by his fireplace at home.

Comfort in the motor car has been a thing of slow growth. In the days when cars were machines instead of vehicles, bodily comfort was less than a secondary consideration; the mechanics of the agglomeration of steel and glass and wire were the first thought. Nowadays, with the motive units and running gear developed to a point where they no longer are a source of worry, car owners have become more appreciative of what car designers have tried to do for their bodily comfort and have demanded more along that line.

Car builders are responding to this demand in their 1917 productions to a greater extent than ever before. They have considered both driver and passengers. Their efforts have been directed along a number of differing lines, but to one end.

Let us see first what the designers have done for the new season in the things which make for comfort of all occupants of the vehicle. Cars as a whole are roomier; they may not be supposed to seat more passengers, but they seat them in greater comfort. Frequently this has been accomplished by an increase in wheelbase. Cadillac, for instance, has added 3 inches; Jeffery—or Nash, if you please—has added 4 inches to the six; National has increased the wheelbase 3 inches; the Stutz, among others, is longer.

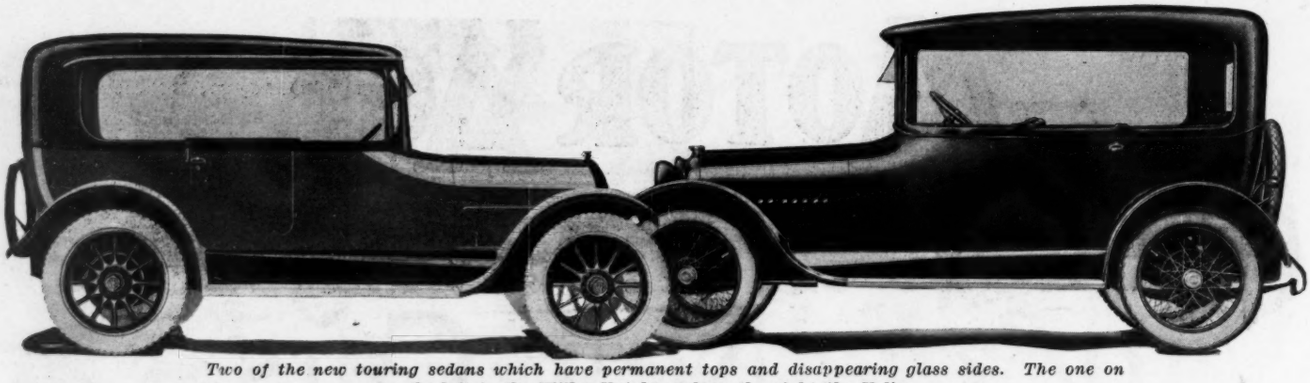


How the double cowl effect is worked out in the Briscoe four-passenger

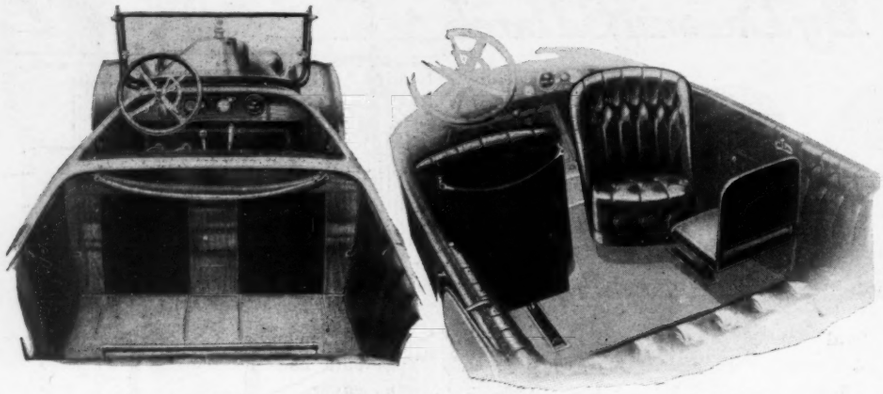
Others have accomplished the same results by altering the body shape and the arrangement of the seating, or perhaps, the shape of the seats themselves. Kissel, Locomobile, Saxon, Glide and Premier are good examples of this method.

The winter-summer body styles are one of the most noticeable of the comfort-making movements. As an idea, the convertible body is not new, Kissel having brought out its all-year bodies several years ago, and something along the same line, by which a winter top could be substituted for the touring or roadster top, has been a part of the program of most manufacturers.

But a newer type made its appearance in a few of the 1916 cars and for the new season is being exploited by a very respectable proportion of the car manufacturers.



Two of the new touring sedans which have permanent tops and disappearing glass sides. The one on the left is the Willys-Knight and on the right the Velie



Jordan's panelling of the front seat back at left and Apperson's individual chairs in the roadaplane

This is the body which has a permanent, non-folding top and glass sides which completely disappear within the body panels. This has the advantage of combining within the one body the summer touring car and the inclosed car for town and winter use. These bodies are called touring sedans, touring limousines, open limousines, semi-limousines, etc., and by some are all classed under the general head of Springfield type bodies. Overland, Studebaker, Hudson, Cadillac, Paige, Mitchell, Velie, Cole, Reo and others feature them, while the concerns such as Packard, Pierce, Locomobile, Marmon, National, White, etc., which offer a wide range of bodies, include these in their program.

Some makers have added little things to the more conventional design which give an extra touch of comfort. Such are the step and tonneau lamps of the Locomobile, the tonneau lamps of Mitchell and Pathfinder, the visor added to the windshield of the Sun to keep its equally-brilliant namesake out of the driver's eyes. Mitchell's glove compartment in the instrument board, and Jackson's button-operated door latch are similar features.

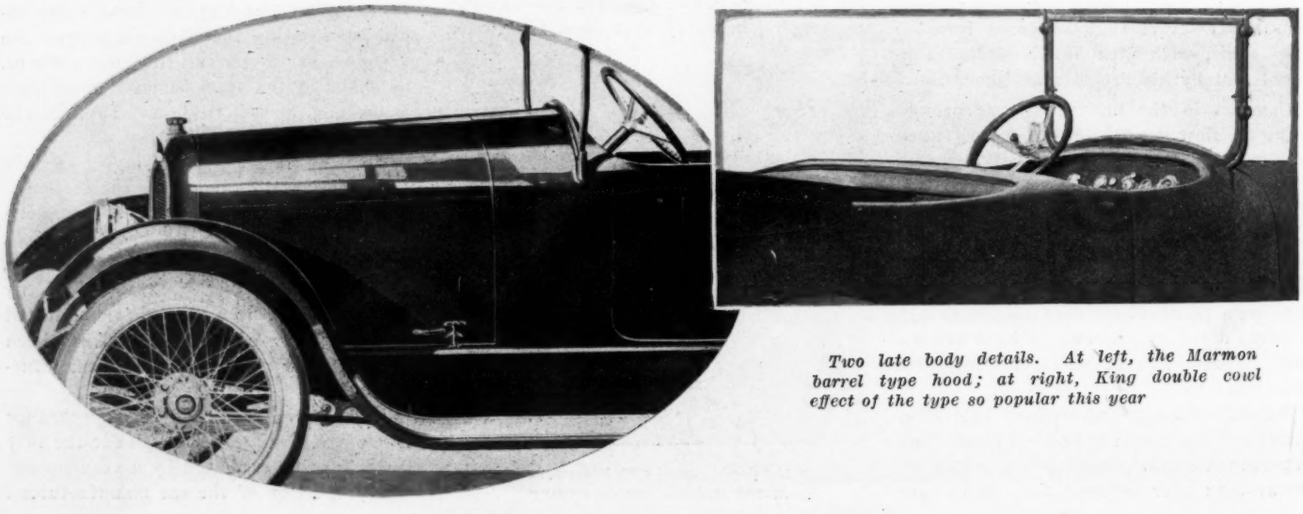
Long-distance tourists in particular appreciate what the depth and quality of the upholstering has to do with comfort in the car. It is a subject of congratulation that more care seems to be taken this season in interior cushioning. Marmon, Moline, and Jordan may be mentioned among those in which special effort has been made. Jordan makes a point of its upholstery, which involves a lot of small coil springs in individual bags. Appearance of upholstery in the new cars is improved by the long plaits in the covering which in many instances supplant the tufted type.

Along with the upholstery may be mentioned an unusual feature as stock equipment. This is the seat covers which Haynes includes with its regular outfit. Haynes also offers another feature, uncommon as stock equipment, in the shape of Hartford shock absorbers. Cadillac includes Gabriel Snubbers in its equipment.

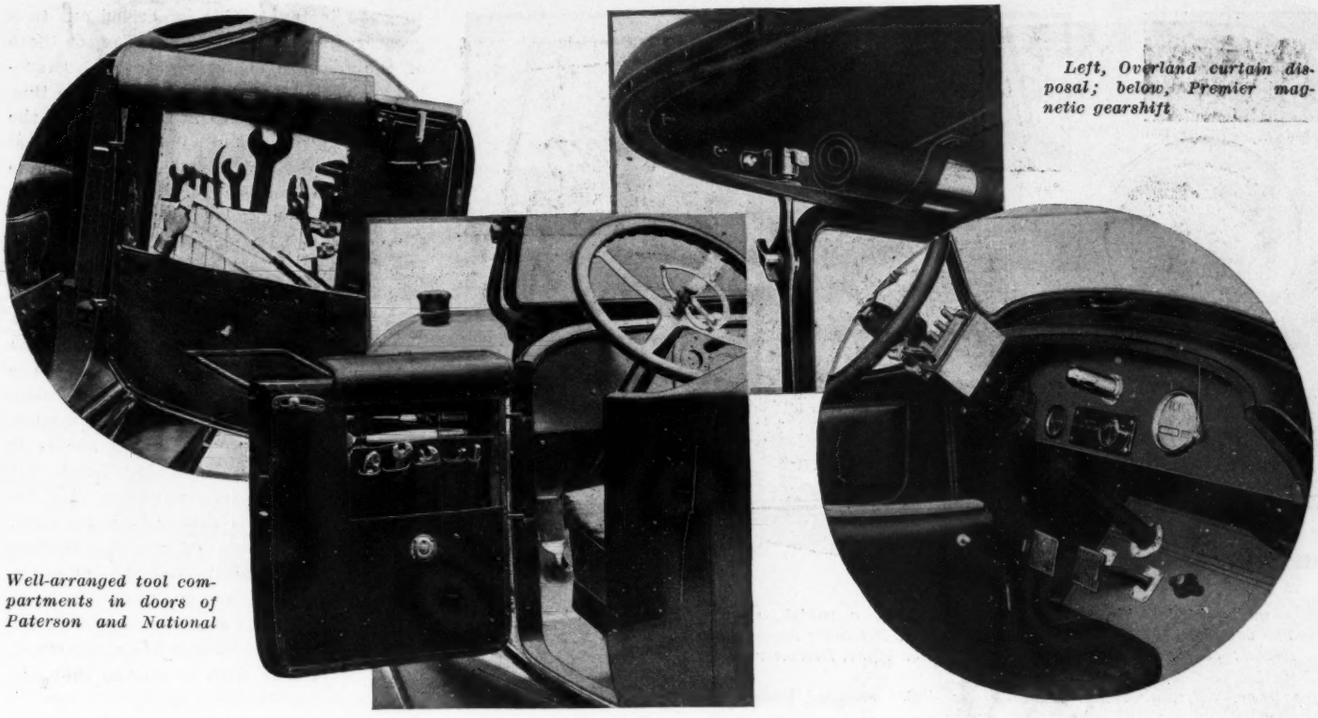
Heaters for winter driving ordinarily are not considered as regular equipment, but both the Owen Magnetic and the Haynes will include Perfection heaters in their inclosed cars. Pathfinder considers the smoker and supplies a cigar lighter. On the Saxon four complete equipment is offered at the list price. This year most of the equipment, starter, etc., was extra.

Radiator Thermometer

It is not stretching a point at all to include a radiator thermometer as a comfort feature, for it adds much to the peace of mind of the driver to know that he has a sure indication of his motor temperature on his radiator cap. Consequently, the fact that a good proportion of the makers are supplying Boyce Motor-Meters as regular equipment speaks as well for the



Two late body details. At left, the Marmon barrel type hood; at right, King double cowl effect of the type so popular this year



Left, Overland curtain disposal; below, Premier magnetic gearshift

Well-arranged tool compartments in doors of Paterson and National

comfort judgment of the car makers as it does for the instrument itself.

Storm curtains which open with the doors are innovations which will be appreciated in inclement weather, and will remove one of the bugbears of winter motoring in open cars. The new type of curtains are supplied on the Dorris and the National.

Individual comfort of the driver has not been lost sight of in this development. Haynes has the driver's seat adjustable in its cloverleaf design. Wescott has its steering column adjustable for height. More attention has been paid this year in arranging the emergency and shift levers handy to the driver's hand without bending, some of the cars in which this is noticeable being the Jeffery, Kissell, Velie and Jordan. Adjustable pedals have become the rule.

No one who has had the opportunity of seeing the 1917 cars that have made their appearance at this date can help being impressed with their improvement in general style. This has come about through a number of changes, few of them radical, but all tending toward a great symmetry of line and form. Even Ford, most conservative, this year has acceeded to popular demand and changed the body to what he is pleased to term a stream line.

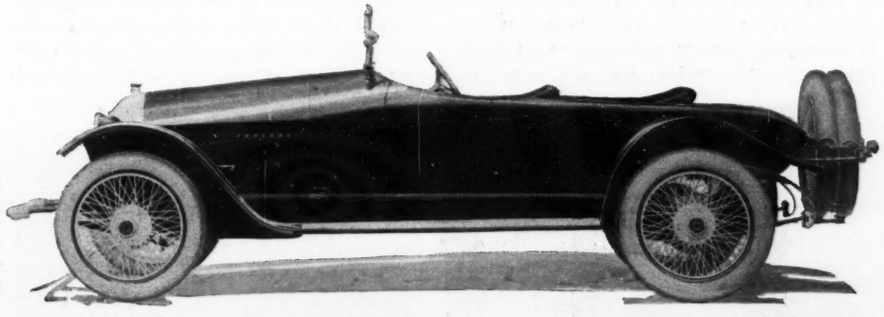
Perhaps the most striking example of conversion to the new idea of rounded hood is the Franklin, one of the most conservative as to bonnet changes. Instead of the sharp angles which have characterized the Franklin hood in the past, there is a smoothly rounded contour, as near to the popular barrel types as possible. It will be remembered that the old Franklin fours had a true barrel type of engine cover.

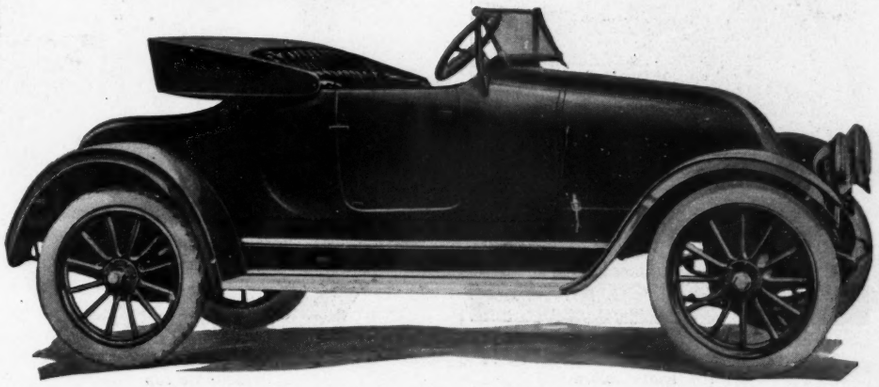
Straight lines from radiator to windshield, straight-sided bodies, some with roll edges and higher sides in some instances, all have had their effect in the general improvement. As a whole, too, the cars are lower and this adds much to the appearance. Packard has lowered its body 2 inches, as have Franklin and Locomobile. The Jeffery six is 3 inches lower, McFarlan is 4 inches less in heighth. Singer and Westcott likewise have lowered the bodies.

The double cowl idea is still popular and among the cars in which this has come into being during the past year, may be mentioned Stutz, Pathfinder, Mitchell, Moon and Willys. The Yale eight, a new one, makes its bow with the tonneau cowl.

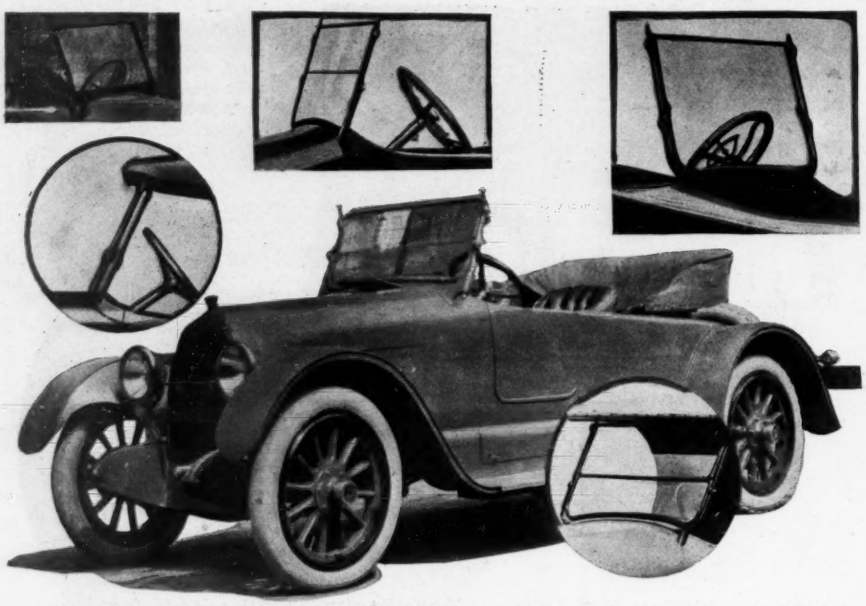
High, narrow radiators are gaining recruits each month. Among the cars in which changes in this direction have been made are the National, Dorris, Briscoe and Velie. The Willys radiators have made a slight movement in this direction.

Many cars will be lighter for the com-





Typical body styles. Above, the Pathfinder four-passenger roadster with its torpedo tail; at right, the new Franklin with its smoothly-rounded hood and cowl lines



Slanting windshields, 1917 features which add a rakish, speedy appearance to the car. The complete car is the Daniels; upper left, Mitchell; upper center, Jackson; upper right, Saxon; center left, Bour Davis, and lower right, Detroiter

ing year. Franklin has reduced by 400 pounds the already low figure of its weight. Overland has gone into the more extensive use of pressed steel with a consequent weight reduction. Kissel and Regal both are lighter without the sacrifice of strength or riding qualities.

The slanting windshield which took the public fancy at the beginning of the year appears on nearly half of the 1917 models announced so far.

Four-Passenger Roadster

In body styles the four-passenger roadster seems to be the most pronounced movement. There are twenty-five distinct makers who have announced this outgrowth of the three-passenger cloverleaf and a number of others have designs in the experimental stage which probably will be put on the market before show-time.

It is not at all easy to design a close-coupled body for four and have it snappy looking with two up and comfortable when four are aboard. The problem is to give leg room enough for rear passengers of average size and at the same time not have too long a cockpit. Most of the designers seem to have succeeded admirably. In one car, the Anderson, the two-or-four idea has been carried to its logical conclusion with a folding rear deck behind the divided seats. The deck disappears when four are to be accommodated, revealing the two rear seats of a very comfortable-looking four-seater.

In spite of the double-cowl influence mentioned above, divided forward seats for touring bodies still are popular. They give the idea of free communication between front and rear seat passengers appreciated by family parties, even though practical considerations may not permit it. In some instances this is carried out to a greater degree by making one or both of the forward chairs revolvable. Studebaker, National and Apperson feature this.

That one must get into and out of the car is a fact that has not been overlooked by the designers. Doors have been made wider quite generally. Levers have been disposed more conveniently, and aisleways betwen seats have been made more easily negotiable.

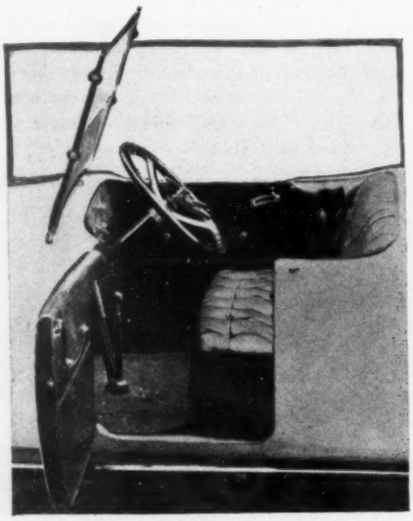
Chassis Improvements

But it is not in the body and its fitments alone that the improvement has been made. The chassis itself has been made the recipient of a great deal of development. The number of cylinders is a question still in a state of turmoil nor is it lessened any by the fact that Buick, for some time past a six advocate, has returned in part to its earlier love, the four. There are a number of new fours, and equal number of new sixes. There are a few new eights, among them Jackson, Scripps-Booth and Yale, a new car. Twelves are holding their own and being improved. Enger plays safe with an engine that can be either a twelve or a six.

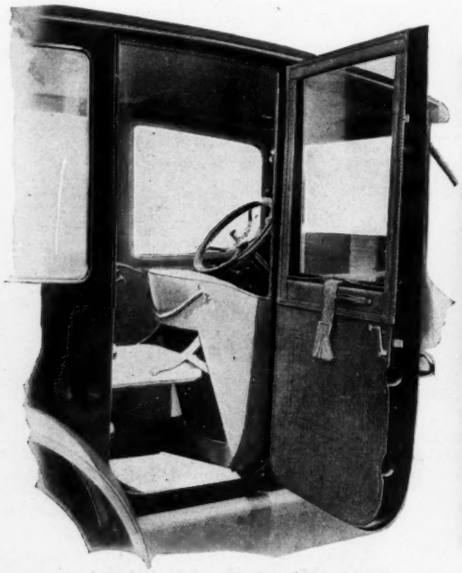
Some of the engines are larger, among them Scripps-Booth four, Moline and Glide; some, such as Kissel and Franklin, are smaller. All of the engines that have been redesigned are higher speed.

Silence of engine operation is improved, partly through the use of a new compressed cloth gear blank which is non-resonant and keeps down the sound of the timing drive. Accessibility is improved in many instances, some of the V engines having their valve alleys cleaned up somewhat and the vertical-cylinder power-plants by better distribution of accessories. Packard Twin Six now has removable cylinder heads.

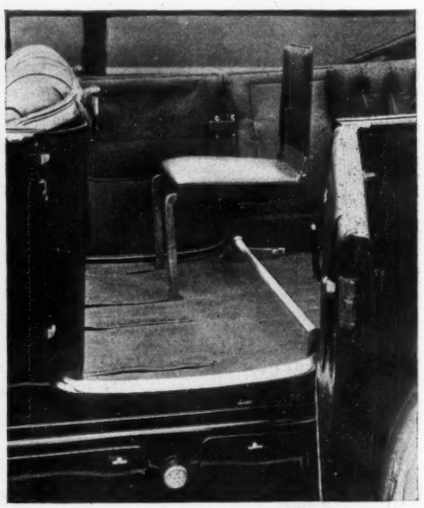
Ignition seems to be turning to battery systems and away from the magneto, Franklin, Overland and Willys-Knight, among others, having become battery igni-



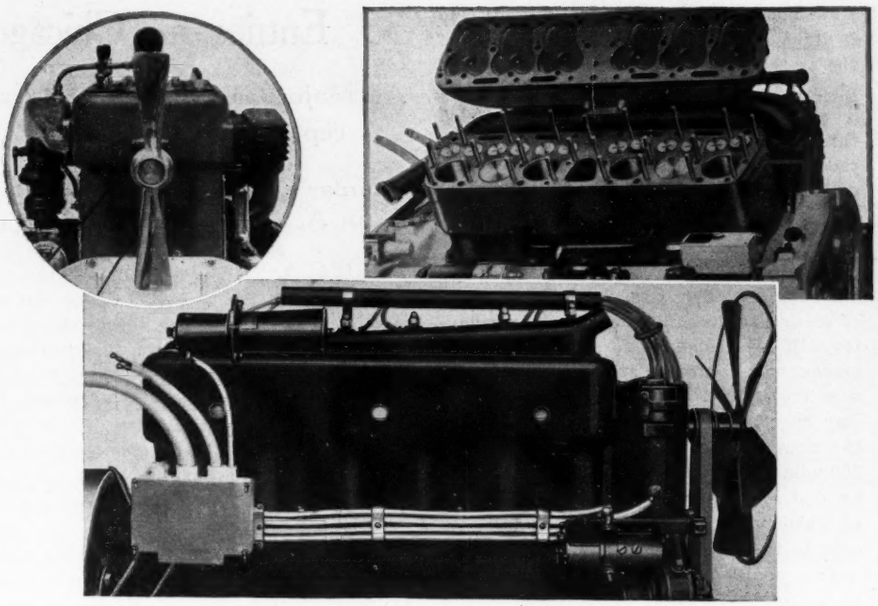
The new Yale eight typifies the effort toward wider doors



An all-year car. Kissel sedan with detachable top



Step light on Locomobile and auxiliary seat arrangement



Illustrating engine tendencies. Upper right, Packard's new removable cylinder heads; upper left, aeroplane propeller type fan as employed by Stutz; below, neat wiring arrangement of Studebaker

tion converts. Starting and lighting seems to be turning toward the double-unit instead of the combined unit, as witness the change of Scripps-Booth, Grant, Moon and Dixie. Also the Bendix starter drive is gaining in popularity with car makers.

Wider Use of Aluminum

There is a wider use of aluminum in the new cars. Of course, the Premier, with its aluminum motor, heads the list in this respect, just as Marmon did last year. Franklin has gone to aluminum on the mud guards, etc. The new sixteen-valve Aland has an aluminum cylinder head.

Four valves per cylinder as a stock proposition had a boost this year in the new Stutz model after its racing success with the sixteen-valve motor.

Vacuum fuel feed is still gaining, Grant, Franklin, Scripps-Booth, Willys six, Bour-Davis, Hackett and Marion-Handley being among the recent recruits.

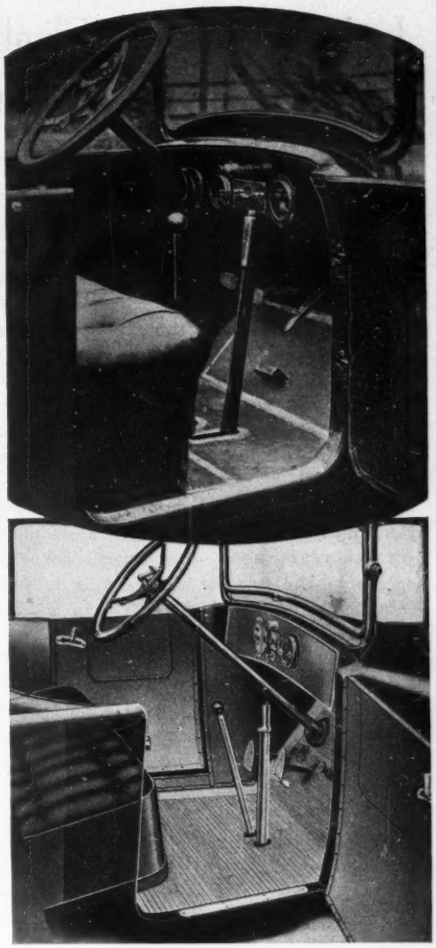
Custom body building on the part of Studebaker, as per the announcement this week in Motor Age, has given added force to that method of body selling. The arrangement by which the purchaser can have a body built to his own desires by the factory that builds the chassis has an appeal to the discriminating buyer. Locomobile, Singer and others marketing higher-price products have pursued similar policies for some time.

Next to this comes the color option which has gained ground latterly. Most of the very high-priced concerns have had this as a feature. Scripps-Booth now has it in restricted form, changing colors each few weeks and offering options of the color combinations.

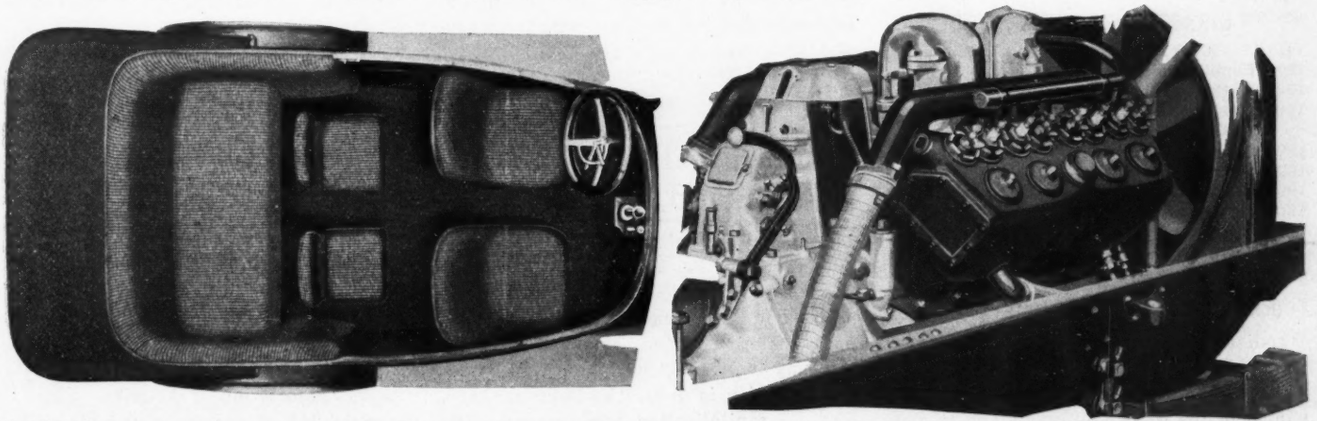
Prices Will Be Higher

There is a great deal more to be said on the mechanical features of the new cars and how they have been improved, but this must be left for later discussion.

Now we come to the sad part of the story. Prices will be higher. That is to be expected, for nearly everything else we buy is higher and nearly everything the car manufacturer buys to put into the car is higher; even the paper he prints his instruction book on costs him more. Explanations are unnecessary; for them we look to Europe. In spite of increased economies in manufacture and distribution, makers found that they could not build the grade of car they planned at prices which obtained the first of the year. There are some notable exceptions, manufacturers both fortunate and farsighted enough to make long-time contracts a long time ago and who are marketing their products at the same price or less than former prices. These, however, are the minority.



Wider doors are features of the year—the Glide, above, and Dixie, below



Vestibuled seating arrangement as carried out in the Haynes, which has seat covers as regular equipment. Accessibility has been improved in the Cadillac by putting the exhaust manifold closer to the cylinders

Junk Wins Hill Climb

Climbs Grant's Despair in 1 Minute, 41 Seconds

Does not Approach Record Set by De Palma in 1910

WILKES-BARRE, Pa., Oct. 7—Fred Junk, winner of one of the events in the Pike's Peak Hill Climb this year, captured the free-for-all event in the Giant's Despair Hill Climb today by driving a Chalmers up the steep mountain course in 1 minute 41 seconds, the course record for the day. With this victory went the John Welles Hollenback Trophy that has been held by the Knox Automobile Co. since the Giant's Despair climb was abandoned several years ago. The record for the course in the free-for-all event is 1:28⅘, established by Ralph de Palma in a Fiat in 1910.

An H. A. L., driven by Turcotte, crowded Junk for the record-breaking honors, his time being 1:45⅘. Third honors went to Hughson in a Pathfinder, his time being 1:47. Dalton, driving a Packard, was fourth, covering the course in 1:50⅘. Emerson, at the wheel of an S. S. E., a Philadelphia entry, took fifth honors with a time of 1:57⅘. Zwally, driving a Stutz, was sixth, his time being 2:10. Haines, of Philadelphia, in a Mercer, came in seventh in 2:15⅘.

In the opening event a Saxon car, the only one entered, developed engine trouble and was disqualified. In event No. 2, Durham, driving a Maxwell, went over the course for first place in 1:50. Junk crowded him close, and C. J. Rogers, Philadelphia, driving a Lexington, finished fifth; time, 2:56⅘. A Mercer, driven by Haines, captured the third event in 1:49. Durham, in a Maxwell, was second, and Emerson, driving an S. S. E., was third. Time, 2:05⅘.

Forty thousand people were on the course when the races started. More than 4,000 cars were parked along the mountain road. Despite the large crowd, not an accident of any kind occurred.

GIANT'S DESPAIR RECORDS

YEAR	CAR AND DRIVER	TIME
1906	English Daimler, H. N. Harding	2:11⅕
1907	Matheson, J. B. Ryall	1:59⅘
1907	Simplex Peugeot (motorcycle), W. H. Wray	1:40
1907	Stanley (steam car), E. W. Harper	1:56⅘
1908	Great Chadwick Six, Willie Haupt	1:38⅘
1909	120 h.p. Benz, D. Bruce Brown	1:31⅘
1909	Indian motorcycle (7 h.p.), W. H. Wray	1:41⅘
1910	Fiat, Ralph de Palma	1:28⅘

JOHNNY AITKEN'S HOMECOMING

Indianapolis, Ind., Oct. 9—John Aitken, driver of the Peugeot owned by the Indianapolis Racing Team Company, and winner of the Astor Cup, was given an ovation last week when he returned here from New York. A large crowd of friends clad in linen dusters and plug hats met him at the station, and after congratulating him, placed Aitken in a rickety cart drawn by a mule. The race driver was paraded through the downtown streets, and the parade continued until Aitken said: "It's on me—I'll buy." Then the procession disbanded immediately.

PRIZES FOR RACE MECHANICS

New York City, Oct. 7—A new system of prize distribution, in which the mechanics will also come in for a share of the money, will be started at the coming Harkness Trophy race October 28 at Sheepshead Bay Speedway. In addition to the $10,000 in prizes for the first six cars to finish the 100-mile race, $2,650 has been set aside to be distributed in lap prizes, 70 per cent of which will go to the driver and 30 per cent to the mechanician.

The regular prize money will be awarded as follows: First, $4,000; second, $2,500; third, $1,500; fourth, $1,000; fifth, $600, and sixth, $400.

Immediately after the 100-mile event, a 50-mile special for non-prize winners in the Harkness Trophy race will be run. Additional prizes, amounting to $2,500, have been provided for this race.

SUNBEAMS RETURN TO ENGLAND

New York, Oct. 9—Special telegram—Speedway races for the rest of the season will be minus the Sunbeam cars, which have campaigned on this side. Joseph Christiaens, the team manager, sailed Wednesday for England on the Finland taking the two Sunbeam racers with him. Christiaens expects to return for the racing season of 1917. He has been here on a leave of absence granted by the British government.

STUTZ MECHANIC DIES

Indianapolis, Ind., Oct. 9—Bert Shields, mechanician for Gil Anderson, who was injured when their Stutz racer turned turtle in the recent race at the Cincinnati Speedway, died at his home in Crawfordsville, Ind., at 7:20 o'clock, October 1. Shield's back was broken in the accident and his recovery was hopeless. He was in the Bethseda Hospital in Cincinnati for a time and then was brought to the Methodist Hospital in the city. Later he was taken to his home.

McFarlan Reincorporates for $3,000,000

Connersville, Ind., Oct. 10—The McFarlan Motor Co. has been reincorporated at $3,000,000 as the McFarlan Motor Corp. and plans to expand. Officers, car and price will remain the same, but later the company will build a high-priced truck. Incorporation is under the Delaware laws. The old capitalization was comparatively small.

33 Entries at Chicago

All Major Cars and Drivers Except Sunbeam Present

Saturday's Race a Deciding Factor in A. A. A. Championship

CHICAGO, Oct. 10—Thirty-three entries for the 250-mile Grand American race at the Chicago speedway, October 14, have been received this morning. Entries closed at midnight last night, but additional nominations are expected in later mails. From the entry list it will be seen that all the major cars and drivers are present, with the exception of the Sunbeam which Christaeins accompanied to England last week.

Saturday's race will be a deciding factor in the A. A. A. championship reward as four drivers, Aitken, Resta, Rickenbacher and de Palma, now are so close in the range of place that a victory for any one of them will place the winner at the head of the list for the championship and the Bosch trophy. If Aitken or Resta win, it will practically clinch the title for the year. Standing of the four leaders now is: Aitken, 2,520; Resta, 2,400; Rickenbacher, 1,990, and de Palma, 1,790.

A new car, the Ben Hur, is to make its debut on the board track Saturday. This is backed by President Reid of the Speedway and has an oscillating valve motor. Louis Chevrolet is slated as driver.

Practice for the race begins today. Fred Wagner is starter; C. G. Sinsabaugh, referee.

ENTRIES FOR CHICAGO RACE

Driver	Car
De Palma	Peugeot
Rickenbacker	Maxwell
Resta	Peugeot
Vail	Hudson
Mulford	Duesenberg
Milton	Duesenberg
Klein	Crawford
Devigne	Delage
Lewis	Premier
Moore	Crawford
Watson	Olsen
Aitken	Peugeot
Lecain	Delage
D'Alene	Crawford
Devlin	Duesenberg
Adams	Adams Special
Pullen	Mercer
Hughes	Hoskins
Mercer	Pugh Special
Gabel	Erbes Special
Henning	Ogren
Chevrolet	Ben Hur
Burt	Ogren Special
Ruckstall	Mercer
Henderson	Maxwell
Galvin	Premier
Chevrolet	Frontenac
Muller	Dans L'Argent
Wilcox	Peugeot
Buzane	Duesenberg
Rawlings	West Duluth Special
McBride	Olsen
Omar Toft	Omar

TRAILER ASSOCIATION FORMED

Detroit, Mich., Oct. 10—Special telegram—Fifteen manufacturers of trailers met at Detroit today and organized a permanent association, the Trailer Manufacturers' Association of America. Plans for a model trailer ordinance and other legislation were discussed. Officers were elect-

ed as follows: President, C. A. Geiger, president Troy Wagon Works; vice-president, Miss K. Gleason, Rochester Trailer Co.; secretary and treasurer, J. C. Enderbrook, Sechler Co.

INCREASE IN CHALMERS PRICES

Detroit, Mich., Oct. 9—The Chalmers Motor Co. announces an increase in the price of several of its models. The seven-passenger touring car now selling for $1,280 will increase to $1,350; the sedan selling at present for $1,780 will cost $1,850; the town car and limousine will rise in price from $2,480 to $2,550. The increase becomes effective December 1, 1916.

HUDSON INCREASES PRICE

Detroit, Mich., Oct. 12—Special telegram —The Hudson Motor Car Co. will increase the price on all Hudson models $175 December 1.

CHANDLER PRICE STANDS

Cleveland, Ohio, Oct. 9—The Chandler Motor Car Co., Cleveland, announces that for the coming season the Chandler company will continue its present model and that there will be no reduction in price of Chandler cars. The announcement adds that in all probability the Chandler price will be advanced.

NEW HESS-BRIGHT HEAD

Philadelphia, Oct. 7—B. D. Gray has been elected president of the Hess-Bright Mfg. Co., this city, manufacturer of ball bearings. Mr. Gray, who was formerly vice-president, succeeds F. E. Bright, who will remain as chairman of the board.

NATCO TRUCK DISCONTINUED

Bay City, Mich., Oct. 9—The Natco truck, a 1-ton vehicle, produced by the National Motor Truck Co. of this city for several years, has been discontinued.

EUSTIS LEAVES CHEVROLET CO.

New York City, Oct. 9—John R. Eustis has resigned as advertising manager of the Chevrolet Motor Co. and will be succeeded by J. H. Newmark, advertising manager of the Apperson Bros. Automobile Co., Kokomo, Ind. Mr. Eustis, before joining the Chevrolet company last May, had been motor truck editor of the Evening Mail for 5 years.

DETROIT PAYS MILLION DOLLARS

Detroit, Mich., Oct. 7—With a levy of $200,000 from Ford Motor Car Co. alone, Collector James J. Brady estimates that Detroit will contribute more than a million dollars to internal revenue taxes this year. The vast increase in motor car production and the new excise tax which exacts a levy on every $1,000 worth of business done by corporations with a capital and surplus in excess of $99,000 are the causes for the great sum this city will pay the nation, according to Mr. Brady.

Jobbers Set Standards

N. A. A. A. J. in Convention at St. Louis

Association Talks of Better Co-operation

ST. LOUIS, Oct. 6—The National Association of Automobile Accessory Jobbers today closed the best convention it ever held. It had a larger attendance, there was more enthusiasm and greater progress was made than at any session held in the brief career of the organization. The growth of the association is phenomenal so far as the motor car trade is concerned for it has attained strong national proportions in 16 months. It now has 291 members; 147 jobbers and 144 manufacturers.

Throughout the session there was evidence of a better spirit of co-operation. Members seemed disposed to work together for the common good and a majority vote upon questions of difference served to establish a standard of practice. The meetings have always been marked, as was this one, by an absence of "hot air" addresses. The sessions are devoted to business only and because of the efficient basis of organization, rapid progress is made in the meetings.

The standards of practice set up will mean much to the accessory trade. The principal recommendations follow:

The practice on the part of newspapers of using a car distributer as bait for participation in a blanket ad by the distributers' dealers was condemned.

Following an address by J. C. Thorpe, of the National Automobile Trade Association, it was voted to work for greater co-operation with the retail organizations.

A committee was formed to investigate overhead expense.

Manufacturers were urged not to place excessive guarantees upon their goods.

Further emphasis was placed on the advisability of charging 10 per cent on returned goods.

The car manufacturer was taken to task for buying more accessories than he needs for car equipment and disposing of them at low prices to his branches and dealers.

Trade directory publishers were urged to co-operate with the jobbers in compiling jobber's lists.

Jobbers were urged not to supply catalogs to dealers, because this often enables the dealers to secure jobbing prices and he thereupon is able to sell at a figure so low that it upsets the trade.

Standardization of shipping and packing was urged and it was recommended that there be a movement among manufacturers toward small shipping units.

Manufacturers were requested not to give prizes to the salesmen of jobbers, because this tends to upset the jobbers' regular business.

It was suggested that manufacturers, when the goods are salable, repurchase bankrupt stocks and prevent the market being flooded with standard goods at ruinously low prices. It was the sense of the meeting that rebates should not be allowed to dealers. On the question of payment of bills, dealers were urged to conform to the terms of the purchase agreement regardless of whether there is a cash discount, and manufacturers were urged to put their business on a more uniform discount basis.

NEW EASTERN CAR MAKERS

Hartford, Conn., Oct. 10—The Eastern Motors Syndicate has been organized and financed in this city for the purpose of designing and preparing all details of a proposed high-grade motor car. This new car will incorporate many engineering refinements that will appeal to the most fastidious. The manufacture of the car will be taken over by the Eastern Motors, Inc., which will be organized for purposes of manufacture and sale.

The Eastern Motors Syndicate has at present an option on two plants and a final selection of a factory location is expected to be made in the near future. Allen Sheldon, chairman of the Eastern Motors Syndicate, has the organization of the work in charge and has developed plans of co-operation with dealers in connection with the merchandising of the product.

ARIZONA RACE LIMITED

Tucson, Ariz., Oct. 9—A 50-mile race for Arizona drivers only to be held under A. A. A. sanction will be a feature of the Southern Arizona Fair here October 27. Tenny Williams will be the referee, and the purses will aggregate $750.

GRANT BACKS UP MOUNTAIN

Los Angeles, Oct. 9—A Grant six, 1917 model, climbed 9 miles to the top of Mt. Wilson. There is nothing unusual about that, but the interesting part of it is that it went backward all the way. The stunt performance was an idea of W. B. Felix, of Los Angeles, who did the trick. The altitude of Mt. Wilson is 6,000 feet.

N. Y. ELECTRICS TOUR

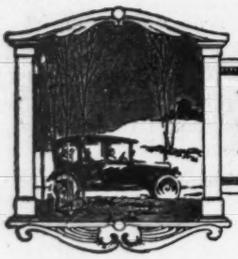
New York., Oct. 8—Under conditions nothing short of ideal, the second semi-annual sociability run of the New York Electric Vehicle Association took place last Wednesday, October 4. The run was made from 62nd street and Central Park West to Longue Vue, near Hastings-on-the-Hudson, and return, and the forty-seven cars participating were exclusively of the electric variety.

MORGAN TO SELL SAXON

New York City, Oct. 9—W. J. Morgan, familiarly known as "Senator" and pioneer in motor car beach races in Florida, has organized the Morgan-Farr Motor Co., Inc., Newark, N. J., to sell Saxon cars. The Senator has been in the Ford selling business for several years.

NEW WAGE SYSTEM

Syracuse, N. Y., Oct. 9—A system developed by the Franklin Automobile Co. now decides what a workman shall receive. Rate of production, spoiled work, years of continuous service, lateness and absence, number of major processes the worker is capable of and monetary responsibility are factors which determine the base rate. And on the day rate an hour the worker can earn a premium, and the higher the premium he earns the higher the base rate becomes. The system is to be gradually extended to all the workmen of the plant. As present about 400 are under it.



EDITORIAL PERSPECTIVES

1917 Highlights

TO attempt to state 3 months in advance just what will be the chief features of an industry as progressive as the motor car industry is to assume superhuman powers of second sight. It is almost as hazardous to attempt to predict just what the features of the new motor car selling season will be by scrutinizing the announcements of say three-quarters of the manufacturers as it is to attempt to foretell the results of an election by means of a straw vote. On the other hand, it may be taken for granted that the designs fixed upon by a major proportion of the car manufacturers are to a great extent indicative of what the market as a whole probably will be and that the same manufacturing and sales policies which influence 75 per cent of the industry will obtain throughout the whole of it.

ONE of the striking features which impresses the student of 1917 cars as they have been announced from time to time is the greater refinement in body arrangement and fittings which make for creature comforts of the driver and his passengers. Only in a few cases are such changes sufficiently extensive to be called radical alterations of design, but these changes have been so general among manufacturers that they show a real and very commendable movement in the industry. There are, of course, a number of makers who do not announce yearly models but make such slight alterations from time to time as the market demands or production schedule makes feasible. Even these manufacturers have come forward with new or slightly altered body types in which this comfort factor is prominent.

QUITE closely associated with the above is another factor which may prove to be the stellar development of the year. This development may be characterized as individuality. For years it has been one of the talking points of some of the higher priced cars that the purchaser could suit his own individual taste in the matter of body design, trimmings and fittings and color combinations. Quite naturally the purchaser paid for this opportunity of exercising his own judgment as to what he wanted in the way of superstructures and it was considered that the high-priced car was the only type which permitted of individuality.

PREVIOUS to this season, when a purchaser bought a medium or low-priced car he had to take what the factory would give him with ordinarily very little choice in body models and finishes. If he desired to have his car look a little different from any other one of the same model, it could ordinarily be done only after he had assumed possession of the car from the manufacturer.

THIS state of affairs has led many of the dealers to install a special body department where bodies could be built, fitted and painted to order and applied to the stock chassis. Quite naturally the next step, and the one which has come about this year, is that of extending the custom body department to the factories of the medium-priced cars, and there are several within the quantity production classification which are offering color options and upholstery options. It is not too prophetic to say that in another year there will be seen a great stride in this direction.

THE awakening of the public to the pleasure and utility of driving a car in the winter has aroused the manufacturers to another big advancement. Winter bodies in a great variety of types are being offered in cars of every price for the 1917 season. The combination car which is convertible for warm weather or cold is getting the most attention and we now have pullmans and observation cars combined in such a way that it is a matter of seconds to convert the body into either. It is a season of individuality and comfort.

Grade Crossing Signs

A VERY few railroads have awakened to the value of designating their road crossings with signs which are useful for the motorists who drive at night. These roads are painting the sign posts with alternate rings of black and white which literally hit you in the face the moment your searchlight plays upon them. They stand out with equal prominence in daylight, and their unusualness detracts the driver from his subconscious state of driving and the effect is that he will look before he leaps.

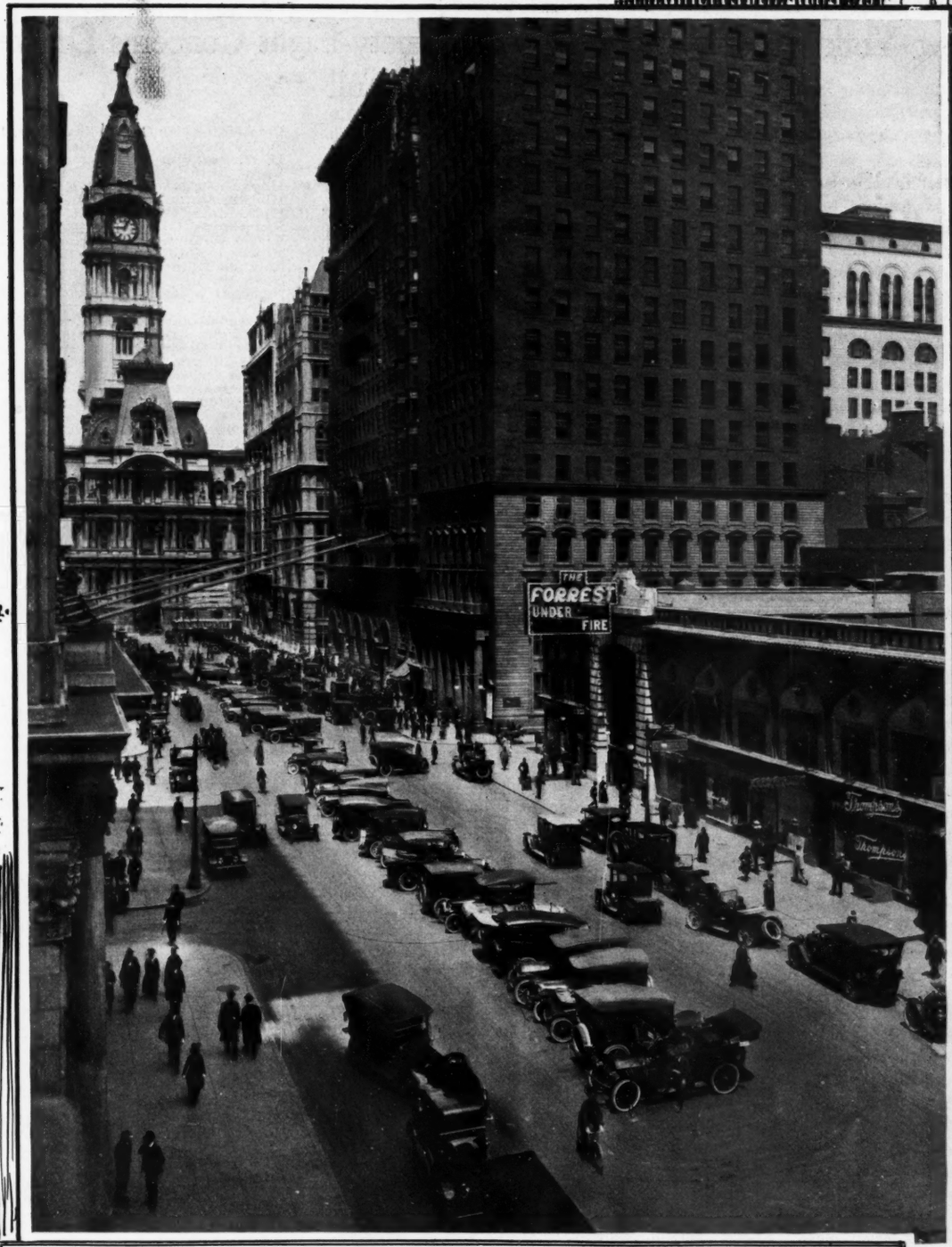
IT is a follow-up for the plea for white bridges and road markers with large black letters on a white background. But the railroads could go a step farther. A touring motorist takes an interest in the railroads he crosses. Furthermore, in localities where railroads are abundant, and a motorist is traveling a road which follows a certain railway, it would be a great assistance to him if he could tell by the crossing signs just what railroad he is crossing.

WHY not a crossing sign with a black and white striped post and the name of the railroad printed under the "stop! look! and listen!" warning? Why not crossing signs advising the motorist that such-and-such a town is 10 miles north? That, too, would often save the motorist from straying in the wrong direction. It would induce him to visit towns he had heard of but did not know were near his route.

ONE might question the value to the railroad of assisting motor car tourists. Such touring is not conducive to railroad ticket sales. The Illinois Central has kept a check on the crossing disasters on its various lines. It blames them to the motorist, saying that he dashes across the tracks recklessly without looking for an approaching train. The motorist, in turn, claims that railroad crossings are not properly labeled and his driving is handicapped in an unfamiliar neighborhood.

WOULD not a crossing sign bearing information of interest to the motorist tend to induce that motorist to slack his speed and read the sign? Would not that slackening of speed reduce road crossing accidents, But as far as night accidents are concerned there are few motorists who do not have a story to tell about how they suddenly drove upon a railroad track without knowing that it was there. The motorist blames the railroad—the railroad blames the motorist. Why can they not co-operate?

Center Parking in Wide Street



VIEW OF BROAD STREET, PHILADELPHIA

Philadelphia is noted for its narrow streets. It has one worthy exception in its Broad street, at the foot of which is located the city hall, as shown in the photograph above which was taken from the Bellview-Stratford hotel. The street has no car tracks and is wide enough to allow parking in the center. This is an ideal condition inasmuch as traffic in opposite directions is segregated, making practically separate streets for traffic going each way. Accidents are few on this street.

Show Allotments Are Made

All New York Space Is Taken When Ninety-Eight Concerns Draw—Chicago Almost as Full

NEW YORK CITY, Oct. 7—Ninety-eight motor car concerns, including five electrics, were allotted space at the New York show at the meeting of the National Automobile Chamber of Commerce. This compares with eight-four last year. Space was given to ninety-four motor car concerns for the Chicago show, as against ninety last year. Every foot of available floor space in Grand Central Palace has been taken, several of the new companies being placed on the fourth floor with the accessory exhibits. As at the New York show, space at Chicago is limited on account of the large number of space allottments.

This meeting each year is the big get-together assembling of motor car makers, who are usually in attendance or represented by others prominent in the business activities of the companies. Today's meeting was the largest, in point of attendance, in the history of the chamber, there being more than 100 car manufacturers represented. Charles Clifton, president of the organization, presided at the general meeting in the morning and S. A. Miles, manager of the shows, came down from his summer home at Christmas Cove, Me., to preside at the space allotments.

That the meeting was a representative one is manifested in the list of those in attendance, including J. N. Willys, Hugh Chalmers, W. E. Metzger, A. P. Chalfant, H. H. Franklin, W. C. Leland, Elwood Haynes, E. J. Moon, W. T. White, W. H. Van Dervoort, H. M. and F. L. Jewett, L. H. Kittredge, Charles Clifton, C. C. Hanch, C. W. Churchill and F. C. Chandler.

Overland Gets First Choice

Willys-Overland, as in the past 3 years, again had the honor of selecting the first position, on account of having been the leader in the volume of business for the year. Following came Buick, Studebaker, Dodge and Maxwell, Cadillac, Chevrolet, Chalmers, Hudson, Packard, Reo, Oakland, Saxon, Hupp, Chandler and Olds. Others up in the drawing were Paige, Mitchell, Haynes, Pierce, Franklin, Nash, Cole, Velie, and Stearns.

At the directors' and members' meeting there was a general discussion of the freight situation with particular reference to the shortage of freight cars as reported by the American Railway Association, indicating 14,000 cars short on September 1. Carload shipments of motor cars for the month of September were 21,660 as against 18,940 for the same month last year.

Several well-known cars will not exhibit at the national shows this year, among these being Locomobile and White. Such cars as the Monitor, Champion, Farmack, Gadabout, Trumbull, Fergus, Remington, S. C. V. and S. J. R. will also be missed from the list of exhibitors. White and Locomobile will be on exhibition in January at the importers' salon at the Hotel Astor, this city. The coming shows, however, will be featured with a large number of new cars, which have never before been exhibited. These include at the New York show: Monroe, Columbia electric, Detroiter, Liberty, Bour-Davis, Ben Hur, Elgin, Drexel, American, Princess, Day, Kent, Doble, Jordan, Emerson, Harroun, Monitor, Dixie and Roamer. The Chicago show will list such new cars as Stephens, Emerson, Dixie, Classic, Harroun, Drexel, Pan-American, American, Ben Hur, Liberty, Columbia, Monroe and H. A. L.

There will be several changes this year in the matter of spaces at New York, on account of the noteworthy shifts in order of the production table. Dodge and Chevrolet have moved up in the list and therefore will be found in much better positions on the show floor. Dodge has moved from a side aisle space to the middle aisle, in back of Overland. Chevrolet this year will also be found in a coveted position right near the entrance along the left aisle in back of Buick.

Of course, Overland, Buick, Studebaker and Maxwell will retain last year's spaces. Others on the first floor this year are: King, Stearns, Olds, Paige, Mitchell, Winton, Pullman, Pierce, National, Nash, Allen, Grant, Saxon, Hupp, Franklin, Chandler, Haynes, Reo, Packard, Oakland, Hudson, Chalmers, Cadillac, Kissel, Velie and Cole.

As at New York, Overland, Buick and Studebaker have retained last year's spaces on the Coliseum main floor. Other changes in placing of spaces have taken place. Maxwell has moved along the cross aisle, next to the Overland. Chevrolet has moved across the aisle in a similar position in the space nearest the entrance. Others on the main floor are: Scripps-Booth, Apperson, National, Dort, Grant, Pullman, Paige, Haynes, Saxon, Chalmers, Reo, Packard, Oakland, Dodge, Franklin, Velie, Winton, Chandler, Pierce, Olds, Cadillac, King, Hudson, Nash, Hupp, Kissel, Briscoe, Allen, Case, Mitchell, Marmon, Auburn, Moon, Stutz, Interstate, Cole, Stearns, Fiat, Mercer, Regal, Jackson and Empire.

CAR EXHIBITORS AT NEW YORK

Main Floor—Motor Car Section

Allen Motor Co., Fostoria, O.
Buick Motor Co., Flint, Mich.
Cadillac Motor Car Co., Detroit, Mich.
Chalmers Motor Co., Detroit, Mich.
Chandler Motor Car Co., Cleveland, O.
Chevrolet Motor Co. of Michigan, Flint, Mich.
Cole Motor Car Co., Indianapolis, Ind.
Dodge Bros., Detroit, Mich.
H. H. Franklin Mfg. Co., Syracuse, N. Y.
Grant Motor Car Corp., Findlay, O.
Haynes Automobile Co., Kokomo, Ind.
Hudson Motor Car Co., Detroit, Mich.
Hupp Motor Car Co., Detroit, Mich.
King Motor Car Co., Detroit, Mich.
Kissel Motor Car Co., Hartford, Wis.
Maxwell Motor Co., Inc., Detroit, Mich.
Mitchell Motors Co., Inc., Racine, Wis.
Nash Motors Co., Kenosha, Wis.
National Motor Vehicle Co., Indianapolis, Ind.
Oakland Motor Car Co., Pontiac, Mich.
Olds Motor Works, Lansing, Mich.
Packard Motor Car Co., Detroit, Mich.
Paige-Detroit Motor Car Co., Detroit, Mich.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Pullman Motor Car Co., York, Pa.
Reo Motor Car Co., Lansing, Mich.
Saxon Motor Car Corp., Detroit, Mich.
F. B. Stearns Co., Cleveland, O.
Studebaker Corp. of America, Detroit, Mich.
Velie Motor Vehicle Co., Moline, Ill.
Winton Co., Cleveland, O.

Second Floor—Motor Car Section

Abbott Corp., Cleveland, O.
Anderson Elec. Car Co., Detroit, Mich.
Apperson Bros. Auto Co., Kokomo, Ind.
Auburn Automobile Co., Auburn, Ind.
Baker, R. & L., Cleveland, O.
Regal Motor Car Co., Detroit, Mich.
Brisco Motor Corp., Jackson, Mich.
Scripps-Booth Corp., Detroit, Mich.
J. I. Case T. M. Co., Racine, Wis.
Stutz Motor Car Co. of America, Indianapolis, Ind.
James Cunningham Son & Co., Rochester.
Dort Motor Car Co., Flint, Mich.
Westcott Motor Car Co., Springfield, O.
Empire Automobile Co., Indianapolis, Ind.
Fiat Automobile Co., Poughkeepsie, N. Y.
Inter-State Motor Co., Muncie, Ind.
Jackson Automobile Co., Jackson, Mich.
Lewis Spring & Axle Co., Jackson, Mich.
Lexington-Howard Co., Connersville, Ind.
Mercer Automobile Co., Trenton, N. J.
Milburn Wagon Co., Toledo, O.
Moon Motor Car Co., St. Louis, Mo.
Moline Automobile Co., E. Moline, Ill.
Mutual Motors Co., Jackson, Mich.
Nordyke & Marmon Co., Inc., Indianapolis, Ind.
Ohio Elec. Car Co., Toledo, O.
Pathfinder Co., Indianapolis, Ind.
W. A. Paterson Co., Flint, Mich.
Peerless Motor Car Co., Cleveland, O.
Premier Motor Corp., Indianapolis, Ind.

Third Floor—Motor Car and Accessory Section

Austin Automobile Co., Grand Rapids, Mich.
Ben Hur Motor Co., Cleveland, O.
Bour-Davis Motor Car Co., Detroit, Mich.
Columbia Motors Co., Detroit, Mich.
Crow-Elkhart Motor Co., Elkhart, Ind.
Crow Motor Car Co., Elkhart, Ind.
Detroiter Motor Car Co., Detroit, Mich.
Geo. W. Davis M. C. Co., Richmond, Ind.
Drexel Motor Car Corp., Chicago, Ill.
Elgin Motor Car Corp., Chicago, Ill.
Enger Motor Car Co., Cincinnati, O.
Hackett Motor Car Co., Jackson, Mich.
Kline Car Corp., Richmond, Va.
Liberty Motor Car Co., Detroit, Mich.
H. A. Lozier Co., Cleveland, O.
Lozier Motor Car Co., Detroit, Mich.
McFarlan Motor Co., Connersville, Ind.
Metz Co., Waltham, Mass.
Monroe Motor Co., Pontiac, Mich.
Standard Car Cons. Co., Dover, Del.
Sterling Auto Mfg. Co., Inc., Bridgeport, Conn
Sun Motor Car Co., Elkhart, Ind.

Fourth Floor—Accessories and Motorcycle Section

American Motor Co., Plainfield, N. J.
Barley Mfg. Co., Streator, Ill.
Day Elder Motor Co., Newark, N. J.
Dixie Motor Car Co., Louisville, Ky.
General Engineering Co., Detroit, Mich.
Emerson Motor Car Co., Long Island City.
Harroun Motor Corp., Detroit, Mich.
Jordan Motor Car Co., Cleveland, O.
Kent Motor Corp., New York.
Monitor Automobile Wks., Janesville, Wis.
Princess Motor Car Co., Detroit, Mich.

CAR EXHIBITORS AT CHICAGO

Coliseum Main Floor—Motor Car Section

Allen Motor Co., Fostoria, O.
Apperson Bros. Auto Co., Kokomo, Ind.

Auburn Automobile Co., Auburn, Ind.
Briscoe Motor Corp., Jackson, Mich.
Buick Motor Co., Flint, Mich.
Cole Motor Car Co., Indianapolis, Ind.
Cadillac Motor Car Co., Detroit, Mich.
Chalmers Motor Co., Detroit, Mich.
Chandler Motor Car Co., Cleveland, O.
Chevrolet Motor Co. of Michigan, Flint, Mich.
J. I. Case T. M. Co., Racine, Wis.
Dort Motor Car Co., Flint, Mich.
Empire Automobile Co., Indianapolis, Ind.
H. H. Franklin Mfg. Co., Syracuse, N. Y.
Grant Motor Car Corp., Findlay, O.
Haynes Automobile Co., Kokomo, Ind.
Hupp Motor Car Corp., Detroit, Mich.
Fiat Automobile Co., Poughkeepsie, N. Y.
Inter-State Motor Co., Muncie, Ind.
Jackson Automobile Co., Jackson, Mich.
Hudson Motor Car Co., Detroit, Mich.
Kissel Motor Car Co., Hartford, Wis.
Maxwell Motor Co., Inc., Detroit, Mich.
Mercer Automobile Co., Trenton, N. J.
Moon Motor Car Co., St. Louis, Mo.
Mitchell Motors Co., Inc., Racine, Wis.
National Motor Vehicle Co., Indianapolis, Ind.
Nordyke & Marmon Co., Inc., Indianapolis, Ind.
Nash Motors Co., Kenosha, Wis.
Oakland Motor Car Co., Pontiac, Mich.
Olds Motor Works, Lansing, Mich.
Pullman Motor Car Co., York, Pa.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Paige-Detroit Motor Car Co., Detroit, Mich.
Packard Motor Car Co., Detroit, Mich.
Reo Motor Car Co., Lansing, Mich.
Regal Motor Car Co., Detroit, Mich.
Scripps-Booth Corp., Detroit, Mich.
Saxon Motor Car Corp., Detroit, Mich.
F. B. Stearns Co., Cleveland, Ohio.
Stutz Motor Car Co. of America, Indianapolis, Ind.
Studebaker Corp. of America, Detroit, Mich.
Velie Motor Vehicle Co., Moline, Ill.
Winton Co., Cleveland, O.

First Regiment Armory Main Floor—Motor Car Section

Anderson Electric Car Co., Detroit, Mich.
Abbott Corp., Cleveland, O.
Austin Automobile Co., Grand Rapids, Mich.
Baker, R. & L., Co., Cleveland, O.
Columbia Motors Co., Detroit, Mich.
James Cunningham Son & Co., Rochester, N. Y.
Crow-Elkhart Motor Co., Elkhart, Ind.
Detroiter Motor Car Co., Detroit, Mich.
Geo. W. Davis Carriage Co., Richmond, Ind.
Elkhart C. & M. C. Co., Elkhart, Ind.
Bartholomew Co., Peoria, Ill.
Hackett-Mansell, Hackett, Jackson, Mich.
Lexington-Howard Co., Connersville, Ind.
Lozier Motor Co., Detroit, Mich.
Lewis Spring & Axle Co., Jackson, Mich.
Monroe Motor Co., Pontiac, Mich.
McFarlan Motor Co., Connersville, Ind.
Moline Automobile Co., E. Moline, Ill.
Milburn Electric Co., Toledo, O.
Mutual Motors Co., Jackson, Mich.
Metz Co., Waltham, Mass.
Pathfinder Co., Indianapolis, Ind.
Peerless Motor Car Co., Cleveland, O.
Premier Motor Corp., Indianapolis, Ind.
Ohio Electric Car Co., Toledo, O.
W. A. Paterson Co., Flint, Mich.
Standard Steel Car Co., Pittsburgh, Pa.
Woods Motor Vehicle Co., Chicago, Ill.

Coliseum Basement—Motor Car Section

American Motor Car Co., Plainfield, N. J.
Barley Mfg. Co., Streator, Ill.
Ben Hur Motor Co., Cleveland, O.
Classic Motor Car Corp., Chicago, Ill.
Dixie Motor Car Co., Louisville, Ky.
Drexel Motor Car Co., Chicago, Ill.
Elgin Motor Car Corp., Chicago, Ill.
Emerson Motor Car Co., Long Island City.
Enger Motor Car Co., Cincinnati, O.
Harroun Motor Corp., Detroit, Mich.
Jordan Motor Car Co., Cleveland, O.
Liberty Motor Car Co., Detroit, Mich.
Princess Motor Car Co., Detroit, Mich.
Pan American Motors Corp., Chicago, Ill.
Stephens Motor Branch of Moline Plow Co., Freeport, Ill.
Sun Motor Car Co., Elkhart, Ind.

CLEVELAND 1917 EXHIBIT FIRST

Detroit, Oct. 7—Cleveland's sixteenth annual exhibit will precede the New York show in 1917. The Forest City display at the Wigmore Coliseum will open December 30 and close January 6. The New York show opens as the Cleveland exhibit ends.

Last year the New York exposition opened at the Grand Central Palace on New Year's Eve, a plan which did not prove satisfactory to the dealers.

St. Louis Row Has Open Week

Dealers Co-operate and Have an At-home in Place of Their Annual Show

ST. LOUIS, Mo., Oct. 9—Motor open week on Locust street — the row — closed at 10:30 Saturday night. Practically all the firms who participated call it a success. Joseph A. Schlecht, chairman of the show committee of the Automobile Manufacturers' and Dealers' Association, says that the effort has proven a very satisfactory substitute for the fall show, which has been the rule in St. Louis.

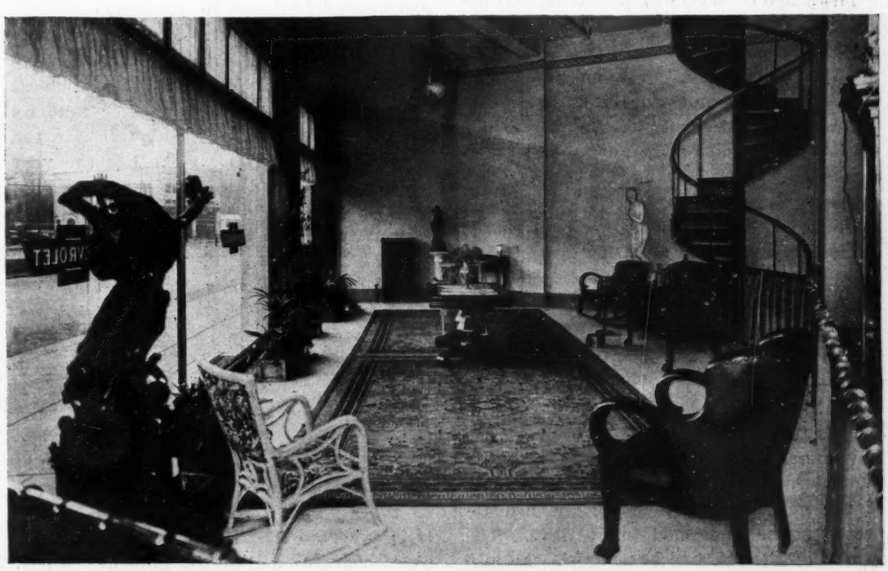
The best feature of the week was the spirit of co-operation that was developed. Those members of the association whose salesrooms are not on the row now and who could not lease temporary quarters for the week were housed, rent free, by members who had large quarters. The visitors were permitted to bring their sales forces to the host's salesrooms and place their swinging sign on the front of the building. Also, most of the dealers kept a car in front of their stores and should a visitor, after looking over the cars displayed there, express a wish to see another make, the car was placed at his disposal to go there—a chauffeur being supplied, of course.

There also was an agreement as to signs, all being exactly of the same design and stating only "Shown here—name of car" —and below "open week 1916." The only variation was the kind of type for the name of the cars, a few dealers having them printed in the trade-marked style. As one dealer put it: "Everybody worked for the benefit of the trade, not only for his particular car. This could not have been done 2 years ago, but it has been a big boost and has won most of the doubters."

The real occasion for open week is a mysterious organization that for 39 years has given the first week in October an illuminated parade called the "Veiled Prophet." This has been the occasion for drawing thousands of visitors, and for a number of years other attractions have been offered. When the first show was organized, this week was selected because many out-of-town visitors came that week, anyway. Recently there has been an agricultural fair the same week. This fair is new and is handicapped by a lack of buildings, so the fall motor show could not be held there, and this year the dealers wanted to get into the national circuit, so they selected open week as a means of reaching visitors and of displaying their cars to the city.

All car salesrooms were kept open until 10:30 at night. Visitors were asked to enter the showrooms as at a motor show and salesmen were instructed not to intrude, but to "stick around, ready to answer questions." A good many visitors who came to the row in machines left them at one end and made the trip along the twelve blocks on foot, stopping at all or most of the stores. This was as the dealers hoped that it would be.

Some business was done. Proof of this is that some of the best show cars disappeared before the end of the week. These were sold mainly to prospects brought to town by country dealers and who insisted in driving their new cars home. Another class of visitors that was greatly appreciated was out-of-town folk who came to see cars and then inquired how soon their local dealer could get this or that model.



Dealers on St. Louis' row arranged to receive visitors as shown in this illustration. Every dealer not situated on the row was given space there for the week

During the 2 weeks two parades were given, each car carrying a card giving its name and price. This parade toured the principal part of the city and by noon reached the agricultural fair grounds, where the machines were parked for the afternoon in a special space set apart. Here they found many persons anxious to look them over. On Thursday afternoon the attendance at the fair was given as 30,000, and practically all of them visited the parked machines.

FORM-A-TRUCK TAKES LICENSE

New York City, Oct. 9—The Smith Form-A-Truck Co., Chicago, has taken out a license from the Redden Motor Truck Co., this city, to manufacture converted trucks from touring cars, under the Cook patent, controlled by the Redden company. The Smith company has up to the present converted Ford touring cars into delivery vehicles, having as its patent in this work No. 1,147,131, granted to W. P. Wynne, July 20, 1915, and applied for June 29, 1914. The Redden company controls patent No. 1,180,475 granted to A. E. Cook and T. Van Tuyl, April 25, 1916. It was applied for under date of Dec. 17, 1910.

The Smith-Form-A-Truck Co. will continue manufacture of apparatus for converting Ford touring cars into delivery wagons as heretofore, but will do so by payment of royalty on the Cook patent. The contract between the Redden and Smith firms is apparently based on the validity of this patent. The Smith Form-A-Truck Co. is one of the largest manufacturers of these truck-making attachments. It was in 1914 when A. D. Smith built his first truck attachment in Seattle, Wash. In May, 1915, the first one for the Chicago trade was manufactured. In August, 1915, the Smith-Form-A-Truck Co. established a Chicago plant and started the manufacture of these attachments on a large scale.

The scope of the Cook patent is well defined in some of the patent claims, No. 32 of which reads:

"The combination with an automobile of a pair of tractor wheels, a frame supported thereon and affording means to elevate the rear end of the automobile thereon, means on said frame for rigidily engaging the rear end of the automobile thereon, means supporting the front end of the frame on and securing the same to the front end of the automobile, and driving connections between the tractor wheels and the power plant of the automobile."

GASOLINE TESTS IN 90 DAYS

Washington, D. C., Oct. 9—The specifications for the purchase of gasoline by the Government, which are to be drawn up by the federal bureau of mines at the request of the general supply committee, are expected to be published in 90 days. The results of the tests to be made in the laboratory of the bureau are to be available to the general public.

Two Companies to Merge

Perfection Spring Co. Will Consolidate with Standard Welding Co.

Stockholders May Take Securities of New Corporation

CLEVELAND, Oct. 9—A merger of the Perfection Spring Co. and the Standard Welding Co., both of this city, will shortly be completed. The consolidation has been approved by the boards of directors of both companies and now awaits the ratification of the stockholders.

The combination will result in one of the strongest factors in the industry, producing among other parts and accessories, motor car springs, heaters and rims.

The capital stock of the Perfection Spring Co. is $2,500,000 authorized, which is divided into $1,000,000 preferred and $1,500,000 common. $1,250,000 of common stock has been issued. The capital stock of the Standard Welding Co. is $2,225,000 of which $2,206,800 is outstanding all of which is one class.

Holders in both companies will be given the privilege of converting their securities into those of the new corporation. This company will have an authorized stock of $25,000,000 common stock and $10,000,000 7 per cent cumulative stock preferred. Borton & Borton, a Cleveland investment house, will underwrite the stock to be issued. The two companies have a combined total asset of $10,000,000.

Spring Company Has Large Force

The Perfection Spring Co., which manufactures motor car springs and at present supplies more than thirty large car makers of this country, is situated at Central avenue and 65th street. The company employs between 1,700 and 1,800 men. It commenced business 10 years ago in 1906 on a capital of $100 and was formed by Christian Girl and M. M. McIntyre. Five years later it was doing a gross business of $209,310 and five years after that its gross was $1,645,829. That was for the year ending June 30, 1915. For the year ending June 30, 1916, the gross business amounted to $3,200,000 and its net earning for the first 9 months of the fiscal year was $282,811.

The Standard Welding Co., which makes steel tubing, rims for vehicle wheels, motorcycle and bicycle parts, motor vehicle rod assemblies and heaters, and does job welding, was incorporated in 1899. The company is located at W. 76th street and the New York Central Railroad. It employs 2,500 men and has a yearly output at present of approximately 50,000,000 feet of tubing and 1,000,000 rims and bands. It is expected that the output of the combined concerns will be the same as the output of the present companies.

Officers of the Perfection Spring Co. are Christian Girl, president and general manager; E. W. Farr, vice-president; P. A. Connelly, secretary; T. E. Borton, treasurer. They, together with F. F. Prentiss, C. C. Bolton and W. R. Clymer, make up the board of directors.

C. W. Bingham is the president of the Standard Welding Co., H. P. McIntosh, vice-president and treasurer, and J. H. Champ, secretary. The board of directors comprises the officers and H. P. Bingham, H. P. McIntosh, Jr., C. C. Bolton and D. S. Blossom.

WINTON ISSUES NEW STOCK

Cleveland, Oct. 7—The Winton Co. has sold to Borton & Borton, investment dealers in Cleveland, $1,500,000, 7 per cent cumulative preferred stock which will shortly be placed on the market.

The Winton Co. is making no change in its policy of limited production, but sales have expanded beyond the present capitalization and the company felt it essential to devote the proceeds of the new stock issue to the development of productive facilities. For the past 12 months orders have been filled from 6 weeks to 6 months later than specified and a change in production was absolutely necessary to the life of the business. Winton has been capitalized for $1,000,000 up to the present new issue.

The sale of gas and oil engines of the Diesel type which the company has also been making, has increased and a part of the new fund will be devoted to the engine factory. The rest of the proceeds will be devoted to the purchase of additional machinery and the erection of more factory buildings.

Up to 1916 the Winton Co. produced between 1,200 and 1,300 cars a year. The past twelve months mark the sale of more than 2,000 cars and the company anticipates that the coming year will see the production of at least 4,000 more.

The company's balance sheet will show total assets of approximately $300 for each share of preferred stock to be issued. Average earnings over the last seven years have been at the rate of about four and one-half times the preferred stock dividend requirements.

HAYNES AWARDS PRIZE

Indianapolis, Ind., Oct. 9—The award of the Haynes Twelve, offered by the Haynes Automobile Company, of Kokomo, Ind., to the owner of the oldest car of this make goes to Ed J. Howard, of Jeffersonville, Ind. Mr. Howard has an old gear-driven Haynes which he purchased at the factory in the summer of 1897. Since that time the car has been in his possession. After a nineteen-year period of service in the hills of the Ohio valley, the car is still in running condition. The old car, which was the oldest of 140 entries, is to be exchanged formally on October 12 in this city. The exchange is to be a part of the Good Roads Day program of the Indiana centennial celebration.

Cleveland a Producer of Parts

Sixth City Wishes Variety in Industries Rather Than Detroit's Leadership in Car-Making

CLEVELAND, O., Oct. 8—According to the 1915 government census, Cleveland leads all other cities in the production of motor car parts which are assembled in other cities into complete cars. At present over eighty manufacturers of car parts are located in Cleveland, and the Cleveland Chamber of Commerce, which has been very active of late in inducing motor industries to locate in Cleveland, has estimated that from 70 to 75 per cent of the parts used in the Middle West manufacturing section, are manufactured in the Cleveland district. These include, drop forgings, sheet aluminum, sheet steel, frames, bearings, leather, paints, varnishes, etc. To these might be added, various accessories, such as batteries, spark plugs, lamps, etc.

In its new campaign to increase its motor car manufacturing position Cleveland, through its Chamber of Commerce, has announced that it does not covet Detroit's leadership as being the first car-making city, but rather has in mind a much wider diversity of industries. The aim is to make the Cleveland district a unit within itself, capable of supplying its own needs in a manufacturing way, without being dependent on other cities.

Wants New Factories

With this end in view, the Cleveland Chamber of Commerce is working to attract factories producing all varieties of car parts, and is at present looking for manufacturers of bodies, sheet metal parts, and additional frame makers. All of these are produced in Cleveland, but greater output is required.

In its work of securing factories for the city, the local chamber has never offered and declares it never will offer, any material inducement to industries seeking a location in Cleveland. There has been formed in the city, however, a Cleveland Industrial Development Co.. with an initial capital of $500,000, which interests itself in the financing of new factories, such as complete cars, parts, and accessories.

Cleveland has many arguments which are advanced as potential reasons for cars, parts, and accessory factories locating here. It is a large primary and secondary steel city. Iron, ore, and coal, can be assembled here cheaper than in any other district in the North. It is a good city for working men, more than 25 per cent of Cleveland's present inhabitants owning their own homes. There is a 3-cent carfare covering the entire city.

This city offers exceptional shipping facilities in that over 350,000 square miles of country are served directly by the railroads radiating from this zone. This is practically 10 per cent of the total area of the U. S. A. Seven trunk lines enter the city, these including, New York Central, Pennsylvania, Big Four, Nickel Plate, Erie, B. & O., and Wheeling & Lake Erie. The city is immediately served by the Cleveland Short-Line Railway, a part of the New York Central. This belt line is 19 miles long and connects all railroads entering the city. There are thirty-nine freight stations within the city's switching limits and twenty-two passenger stations. In addition there are six electric interurban systems radiating from the city through Northern Ohio.

In a previous issue several of the Cleveland factories which are engaged in the motor car industry were referred to with the object of showing their growth during the past season. There are many others in the city, some of which refuse to make public figures showing the growth of the industry, and others from whom it has not been possible to get the information to date.

The Columbia Axle Co., established 3 years ago, has increased its business fourfold during the past year, and now has capacity for 75,000 axles per year. Over 450 men are employed, and 50,000 square feet of floor space used. New additions are planned to add 5,000 square feet floor space for a rough stock and receiving department. These will be ready in 30 days. Besides manufacturing front and rear axles for several passenger car makers this concern manufactures truck axles for several concerns.

During the past year the Reflex Ignition Co., has increased its business 25 per cent and doubled its manufacturing space. Over $20,000 worth of new machinery has been added for its spark plug manufacture. Its capacity is 3,000 per day. The factory has been working overtime 3 hours per day since July.

The Torbensen Gear & Axle Co., has during the year added 60,000 square feet of floor space to its own manufacturing facilities and is employing 200 men. Over $100,000 worth of new machinery has been installed. In 1915 approximately 1,900 Torbensen axles were produced and sold to motor truck manufacturers. By the end of 1916 11,000 will have been produced and sold. For 1917 the production figure is 25,000. In addition to its own manufacturing facilities the company has had to contract with another Cleveland concern for the manufacture of many axles which its capacity will not permit.

Globe Increase Is Large

The Globe Machine & Stamping Co., makers of tool and battery boxes, of which its output is now about 1,000 boxes per day, reports a 40 per cent increase in business, the total business amounting to $600,000, or 100 per cent better over 1914. This company also manufactures hose clamps and universal joint cover clamps for the motor car trade as well as a line of special stampings and pressed metal parts to order, the latter amounting in volume to about $1,000 worth per day.

The present factory now contains 60,000 feet, having recently been enlarged by a second-story added to the tool box building, 165 by 100 feet. New machinery has been installed during 1916, valued at $20,000. The company this year has also bought an acre of land near its factory, and is now adding a brick and concrete construction materials storage building. The ground floor of this building will contain about 10,000 square feet. Space is reserved around the sides of the plant for an L-shaped factory to be erected later, each wing of which will be about 200 by 60 feet, three or four stories in height.

The Hydraulic Pressed Steel Co. has increased its business 15 per cent during the past year. In that time it has erected five new buildings as follows: A forge plant 360 by 80 feet; a motor car frame plant 560 by 80 feet; a receiving building 120 by 60 feet; a power plant 80 by 40 feet, and a pump house 160 by 40 feet. Over $400,000 worth of new machinery has been installed. The company now employs 1,200 men, has a capacity of 1,500 motor car frames per day, and two-thirds of its entire factory has been working at night since 1914.

TRACTOR FACTORY COMPLETED

Moline, Ill., Oct. 9—Moline universal tractors will have the distinction of being made in the largest tractor plant in the world. Covering 5½ acres of floor space, the factory, just completed, is a model of efficiency and convenience. The roofing contract was the largest of its kind placed in the United States this year. Construction commenced July 22, and part of the plant was in operation September 26. Raw stock and materials enter one side of the plant and are worked forward in a continuous process until the finished tractor emerges. All material is handled but once for each operation and moves from one machine to another in regular order. The entire plant was arranged to avoid delay and prevent waste of time. The foundry will make castings for all Moline implements. The remainder of the plant will be devoted exclusively to the manufacture of the Moline universal tractor.

Uniform Traffic Code

Standard Regulations Necessary Say Police Chiefs, Motor Clubs and Trade Organizations—Individual Changes Suggested

A Silent Traffic Officer

ON corners where a traffic officer is not regularly needed, the method used in Long Beach, Cal., may be applied with good results for marking corner centers. This is shown in the accompanying illustration. It consists of a large white dot, about 3 feet in diameter, painted directly in the center of the street intersection. To the driver of the approaching vehicle the dot at each intersection is plainly visible and there is not one driver in 100 who, upon seeing one of these features, will fail to realize why it has been placed there. The white dot contrasts vividly with the pavement of dark asphalt or macadam. These dots are placed on corners where regular traffic officers are not absolutely necessary, and it is remarkable how efficiently they do their work.

The inexpensiveness of these dots is one point which appeals strongly to the officials of cities and towns. The cost of each dot is very trifling, being simply that of the small amount of paint and the labor of applying it. The latter cost is very small, as it is simply a matter of placing a steel form upon the pavement and painting the sapce within the circle.

Some such simple means as this will often obviate needless expense where conditions do not warrant a more costly fixture or an officer on permanent post.

Favors Block System

FRANKFORT, KY.—Editor Motor Age—In regard to uniform traffic laws, I think the Eno traffic ordinance the simplest and most effective measure that could be taken to regulate traffic.

Personally I think the "block system" should be incorporated in the ordinance also. Though the author of your story introducing the Eno traffic ordinance disapproves the operation of semaphores to stop and start traffic at busy intersections, its use in Louisville, Ky., and Indianapolis, Ind., has proven quite successful and there is no unreasonable delay unless you would call proceeding-with-caution delay. Furthermore, I can say from actual experience and observation that there is no complaint in Louisville, Ky., at least, of delay to traffic through the enforcement of the semaphore system.

Why do you not have the National Chamber of Commerce, of Washington, D. C., and similar national bodies take a referendum vote on the Eno traffic ordinance, with suggestions of modifications, if any are proposed, and from a consensus of opinion of communities in excess of 5,000 population draft an ordinance to be recommended by such national bodies for general adoption, at the same time securing the pledge of as many organized communities to urge the adoption in their municipality of such uniform ordinance?—C. F. Dunn, Secretary-Manager Frankfort Chamber of Commerce.

Against Spot Light

Iowa City, Ia.—Editor Motor Age—I have read the copy of the proposed traffic rules and see no reason why they should not be adopted in all towns and cities of 10,000 and up, with such modifications as may seem fit for certain communities.

I would like to add that there had ought to be very drastic legislation drawn for the enforcement of dimmers or some other method of taking the blinding glare off of the present electric and some gas lights.

The spotlight ought to be ruled off the car except when absolutely needed, and further, when a car is left standing at the curb and lights left on, the car ought to be turned in toward the curb instead of out into the street to blind the poor motorist who must face this glare of light that is doing no one any good. I have met with this time and again in our city. We have had several accidents in our city the past season and one death due to these bright lights.

Driving in the country ought to be better regulated at night with these lights also. I have often wished that I had a gun to put some of those lights out; for, as a rule, the fellow with the bright lights is going as fast as he can and will not turn out or put on his dimmers even if he has them.

Why not bond every driver to observe the rules of the road and the state and observe at least a little courtesy and decency?—George J. Wenzlick, M. D., Secretary Iowa City Auto Club.

Standard Regulation Necessary

Moline, Ill.—Editor Motor Age—The matter of traffic regulation in cities is very important, due to the rapidly increasing number of motor cars in use. Our streets are becoming so crowded with rapidly moving vehicles, that the question of proper regulation of traffic should be given serious consideration by all municipal authorities. I believe Motor Age is doing a valuable work in instituting this campaign, and I commend you for your interest in this most important subject.—M. J. Duryea, Executive Secretary Moline Commercial Club.

Minor Changes Perhaps

Richmond, Ind.—The little time that I have been able to give in looking over the article entitled "Standardizing Traffic Rules" has very much interested me, and it meets my full approval, although it might be wise to make some minor changes. In my opinion uniform traffic laws in all cities has been a long felt need by the entire public.—H. D. Goodwin, Superintendent of Police.

Wants Fewer Hand Signals

Memphis, Tenn.—Editor Motor Age—I have read with interest your opening article "Standardizing Traffic Rules," and wish to make a few comments on the much confused matter of hand signalling by the driver.

According to the Eno system—which you have selected as a basis upon which a model ordinance can be founded—I note there is a signal to be given when you are going to turn a corner at the right, and a signal to be given when slowing or stopping.

I contend that there is absolutely no need for the driver giving a signal by holding out his hand—or by similar means—only when he intends to turn to the left. Any other signal given by the driver, with the exception of sounding the horn, is not only unnecessary, but confusing.

For example: I am driving north and am going to turn east. I have the right-of-way between my car and the right-hand curb. The car following me is not concerned about my turning to the right; neither is the traffic officer on the crossing, since I am following the right-hand curb and not leaving the regular course.

If I am going to turn west, then I would hold out my hand in order to convey my intentions to turn from the regular course to the occupants of any car which might be following me, as well as to the traffic officer

on the crossing. If I am in a left-hand drive car, I would extend my left hand, and if a right-hand drive, my right hand.

A signal intended to convey one's intentions to slow down or stop is not only unnecessary, but dangerous. Every person driving a motor car is expected to keep a sharp lookout ahead and if the car ahead of him is going to slow down or make a stop he should see it. The car itself serves as a better signal in this instance than anything else.

It would be absurd to expect the driver ahead of us to display a signal indicating his intentions to stop, before applying the emergency brake and stopping at once if possible when about to run down some careless pedestrian who had stepped in front of his car. Yet the man following might run into him because he did not display his stop signal. Hence the impracticability of such a signal.

As for a backup signal, the only thing for the driver to do when he wants to back up is to turn his head and make sure that the way is clear before attempting to back up, then keeping a lookout behind him as long as he continues to move in a backward direction.

I am not from Missouri, nevertheless I would be very glad to have some one show me the necessity for any hand signal other than the one conveying the driver's intentions to turn to the left.—S. J. Sibley.

Likes Eno Plan

Lima, Ohio—Editor Motor Age—I have read your article on "Standardizing Traffic Rules" with much interest. I believe your plan is right. I am heartily in favor of a standard traffic ordinance for all cities in the United States. I believe the Eno plan has more to commend it than any other that I have seen.—W. C. Bradley.

Uniformity Would Save Annoyance

Battle Creek, Mich.—Editor Motor Age—The Battle Creek Chamber of Commerce is in favor of your campaign for uniform traffic regulations in all cities in the United States. While the traffic squad has improved conditions greatly, the uniform code for all cities would save a great deal of annoyance.

Battle Creek is on the main highway between Chicago and Detroit and is visited by thousands of tourists yearly. We pride ourselves on our hospitality and would save our officers a great deal of time and labor and our guests some embarrassment if our traffic regulations were the same as the other cities they have passed through.

We heartily approve of your plan and wish to compliment you on your efforts in this matter.—Grant S. Bennett, Secretary Chamber of Commerce.

Will Save Thousands

Chicago—Editor Motor Age—With reference to your campaign for uniform traffic laws in all cities of 5,000 and over, permit me to congratulate you and assure you that the Chicago Motor Club and the writer will be pleased to lend you every assistance possible in this splendid work.

I believe that when you have succeeded in unifying the traffic laws of this country, the result will be the saving of thousands of dollars to the motorists as well as a great deal of inconvenience in saving them from arrest.—Charles M. Hayes, President Chicago Motor Club.

Traffic Regulation Developments

N. A. C. C. Members Advocate Uniform Code—Ban Headlight Glare

NEW YORK CITY, Oct. 9—The 100 motor car manufacturers who attended the meeting of the National Automobile Chamber of Commerce were keen to advocate uniform traffic ordinances throughout the country, especially in suburban and rural districts. The makers contend that the old law of vehicles traveling north and south should have the right of way is open to debate with the motor car, along with other so-called old laws, and would consider the plan of giving the right of way to the vehicle coming from either the right or the left, whichever is deemed best for easy handling of traffic.

The makers also agree that the glare of searchlights is dangerous to the use of motor cars on the road and will advocate the arrangement of such lights so that the beam will not show more than 42 inches above the ground at a distance of 75 feet.

POLICE POWERS LIMITED

Cleveland, Oct. 9—Representatives of the Cleveland Automobile Club protested to the city council committee on streets against a proposed amendment to the traffice ordinances which would give police unlimited powers. The ordinance reads: "Drivers of all vehicles must at all times comply with any direction, by voice or hand, of any member of the police force as to placing vehicles, stopping, starting, approaching or departing from any place, the manner of taking up or setting down passengers and the loading or unloading of goods or merchandise in any place." This is one of the provisions in the Eno code as proposed by Motor Age.

Automobile club representatives contended this was too drastic and members of the council voted to bring in an adverse report. The council voted to make illegal any hitching upon cars without the consent of the owner.

BOSTON GIVES PARKING SPACE

Boston, Mass., Oct. 7—The Boston Street Commissioners have at last thrown open to motorists the first public parking place in the city, a small section of Boylston street where it will be possible to park some fifty machines. A part of Park Square, nearby, is also under consideration where a dozen more cars may stand. The provision is made that the business houses on Boylston street, where the cars are to be parked, shall maintain a special policeman to guard the cars from theft. Since Boylston street was widened to allow the street cars to enter the subway near the Public Garden it gave a section from the subway to Park Square that was extra wide. The subway entrance has traffic ways on either side and then there is the space like a city block vacant beyond it. In the center section of this space the cars are now parked. There is no time limit on their stay.

THEFT INSURANCE INCREASES

Chicago, Oct. 9—The numerous thefts of cars in Chicago have bought new insurance rates for Cook County during the last week. The increase is the first that has been made on the basis of differences in hazards between certain cities and localities. The National Automobile Underwriters' conference has been assembling statistics as to car thefts, and further changes in rates are expected by the first of the year. Advances are said to be necessary if the insurance companies are to cover the increasing loss from stolen cars. The increase made is entirely in the theft rates.

U. S. MAIL DRIVER FINED

Boston, Mass., Oct. 7—It cost Roland S. Ford, driver of a United States mail wagon, $10 in court to learn that he was not immune from the motors laws, at Boston yesterday, and before the Highway Commission gets through with his case next week when he has a hearing he may find his privilege to drive has been revoked. Ford has been driving a motor truck owned by the Boston Delivery Company, but leased to carry mail, and while going along Boylston street where it was muddy he seemed to delight in creating splashes.

NATIONAL PARK TRAFFIC LARGE

Yosemite, Cal., Oct. 9 — Seventy-eight per cent more cars entered Yosemite National Park during this season than last, according to the supervisor of the park. The total number of cars entering the park this year was 4,043, and the number of passengers carried into the park by private cars was 14,527, which was 43 per cent of the total travel, as compared with 7,166 during last year, an increase of 102 per cent in this respect.

The Tioga road shows the large increase of 684 cars as compared with 190 last year. No new roads have been opened, but a new road connecting the Tioga and Yosemite Point is planned.

Motorists entered the park this year under different regulations. The roads on the floor of Yosemite valley were free, with the privilege of running at night. The block system was installed on the steep, narrow grades leading from the valley.

Ideal Truck for U. S.

Specifications for Military Motor Vehicle Are Drafted by Engineers

Requirements Are Detailed But Subject to Revision

NEW YORK, Oct. 9—The American Engineers' ideal army truck will soon be a reality. The Society of Automobile Engineers, through its standard division and its members generally, is drafting a composite specification list, embodying the ideals of a great number of engineers. The object is to have the truck engineers of America go on record as to what they think the army truck should be.

A tentative list of specifications, already prepared, for a 1½-ton capacity gasoline military motor truck embodies some interesting details among which are the following. This schedule will be revised when a change is considered worthy:

"All parts of the trucks must be constructed to definite standard measurements, so that any part of same may be replaced and properly fitted and adjusted without requiring additional tool or machine work on the parts.

Materials Must Be Listed

"A complete list of all materials used in the construction of the various parts of the truck must be given, together with the chemical composition and physical properties of same.

"The normal load capacity above the chassis, including body, shall be 4,480 pounds. The maximum load, 5,080 pounds.

"The maximum road speed shall be 14 miles per hour, obtained by a maximum motor piston speed on high gear of 1,100 feet per minute, limited by a governor.

"The engine shall be located in front under a hood and shall be the four-cylinder vertical type, with a piston displacement of not less than 300 cubic inches. Ignition by high-tension magneto with battery for starting.

"Timing must be marked on the flywheel.

"Provision must be made to keep dust out of the carbureter air intakes, crankcase breather and oil filler.

"Water cooling must be used with forced circulation by centrifugal pump, which must be of design to permit thermosyphon circulation in event of pump failure.

"The hood must be supported independently of the radiator.

"The starting crank must be arranged to fold up when not in use.

"The clutch must be dry-disk or dry-plate type with either a spring adjustment or a spring sufficiently long to automatically compensate for wear on disk surfaces.

"Gearset must be of the sliding gear type, with four speeds forward and one reverse.

"The Hotchkiss drive, transmitting both torque and thrust through the rear springs, will not be accepted.

"The rear axle may be of the worm gear type, or a double reduction gear type with the reduction gearing in a central housing.

"All wheels shall be of cast steel and interchangeable, although not necessarily identical as to design.

"Wheel base must not be less than 11 feet nor more than 13 feet.

"Frame length back of driver's seat available for body, 10 feet 5 inches.

"Road sprags must be fitted. These sprags must be of the triangular type and fitted with restraining chains and lifting device.

"On hard roads of 25 to 40 pounds per ton resistance to tractive effort, the fully loaded truck must climb, on high gear, a 5 per cent grade, and on low gear, a 25 per cent grade. Under the same road conditions, the fully loaded truck must be able to start from a stand-still in low gear on a 25 per cent grade.

"All military models submitted will be required to undergo a 2,000 mile road test, with regular enlisted drivers, carrying a maximum load of 5,080 pounds above the chassis, over give and take roads, embodying severe operating conditions."

KISSEL SALON ANNUAL AFFAIR

Hartford, Wis., Oct. 8—The All-Year Car Salon held last week by Kissel dealers throughout the country is to be an annual affair.

It is believed by the Kissel Motor Car Co. that such an exhibition is a distinct service to motorists and will-be motorists because they are able to gain in this manner a thorough knowledge of a given car.

To Hold Motor Tag Day

Oakland, Cal., Will Raise Funds for Fallon Sink of Nevada

Plan Is Part of Effort to Get $50,000

OAKLAND, Cal., Oct. 9—Motordom's first tag day is coming. Children, churches and charities have played tag for years. Sometimes, too, they have played hob with feelings and change pockets.

Now the Oakland Chamber of Commerce has taken up the idea with the object of filling the sink holes in the Lincoln highway and with the expectation also of sending everyone away happy after he has given his share. For every dollar contributed a pretty girl will give the donor a Lincoln highway pennant to hang on his car and will tell him, too, that his money has gone to smooth out the great transcontinental road for the benefit of him and his fellow motorists.

The first motor car tag day will be held where the Chevrolet company has built its $1,000,000 Pacific coast plant. There the "Fallon Sink" of Nevada—the bugbear of the transcontinental motorist, a bog of alkali and sand into which machines sink hub-deep—will be reproduced in all its horrors so that every driver going or coming will have the same experience as is undergone by one traveling from coast to coast.

TO HAVE USED CAR SHOW

Chicago, Oct. 9—A new solution of the used car problem may be offered by the Chicago Automobile Trade Association in its used car show in the Coliseum May 8.

ARMY MAIL MOTOR TRUCK

On its recent 8-day hike from San Antonio to Austin, and the same number of days returning, the division of fifteen thousand troops received a mail delivery several times a day by means of a motor truck. This vehicle was kept in constant service, plying between the nearest postoffice to the marching column and the different units comprising the division. All mail was forwarded by regular trains from the postoffice at Fort Sam Houston, destined to the different postoffices, situated nearest to the camp locations along the route. The motor truck hauled the mail from the postoffices to the camps, where distribution of thousands of letters and packages was made. Tons of mail were thus distributed each day

The proposition was decided today at a meeting at which a committee, which has been working on this matter, outlined plans. The show will take up the week of May 8 to 14, and space in the Coliseum will be sold at 40 cents per square foot, assignments to be by public drawing.

Dealers will show rebuilt cars which they represent and other used cars they have taken. The trade association will get one-half the profits, which will be divided among its members, the Coliseum getting the other half. Tickets are to be 25 cents each, and one exhibitor's ticket is allowed per square foot of space. It is figured it will cost the exhibitor $60 per car for space.

OHIO DEDICATES MARKER

Columbus, Ohio, Oct. 9—Under the auspices of the Good Roads Federation of Ohio and with the best wishes of the National Old Trails Road Association, which were represented at the ceremonies, a unique marker erected at the "Eagle's Nest" beside the historic old national road, 42 miles east of Columbus and 14 miles west of Zanesville, was dedicated October 7.

The marker was given by good roads enthusiasts in commemoration of the fact that for the first time since 1828 the national government has again adopted the policy of appropriating funds for road construction and rehabilitation in the states, and that with $120,000 of such funds, along with state appropriations, there have been completed 27 miles of the finest concrete roadway in the world, that from Hebron to Zanesville, along the line of the old national pike.

The site of the marker was chosen for sentimental reasons. The high point known as the "Eagle's Nest" was a landmark in the old days of stage coaches and post riding. The marker consists of a large granite boulder mounted upon a boulder base and bears a chiseled inscription commemorating Governor James M. Cox's work, which resulted in launching the project for the rehabilitation of the National road from Wheeling to Columbus in 1914.

C. A. C. WINS MATCH

Chicago, Oct. 9—Drivers of the Chicago Automobile Club carried off all the honors Saturday in the interclub annual fall reliability match with the Chicago Athletic Association and the South Shore Country Club, winning both the trophy for the lowest total number of penalties and that for the most perfect scores. Only one of the club drew any black marks, and these were four for aiding a driver on a rival team. Second honors went to the South Shore Country Club with ten penalties.

The forenoon run was 66 miles out to the Aurora Country Club, where the motorists had dinner and 2 hours of golf. The run back to Chicago was 67 miles by a different and more roundabout route.

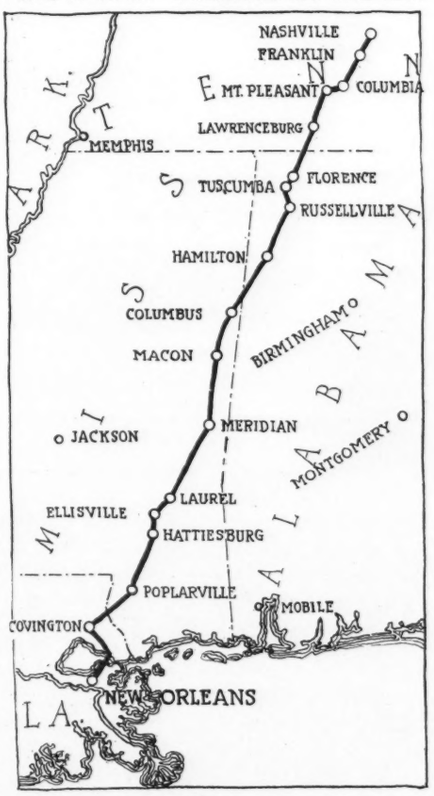
Rivalry Builds Roads

Inspectors of Alternative Southern Routes Report Construction Activity

Two States Strive for Part of Jackson Highway

NEW ORLEANS, La., Oct. 7—The official inspection party of the Alabama and Mississippi routes of the Jackson highway from Nashville, Tenn., southward arrived in New Orleans today after following the Alabama section and will leave Monday to cover the Mississippi route. Just a year ago the two states mentioned were put on a competitive basis as candidates for the honor of containing part of the Jackson highway, and the incentive has resulted in road-building such as the states have never known before.

Eastern Mississippi and northwestern Alabama seemingly have an inborn desire to follow the path of Jackson when he took his army to Nashville after the New Orleans battle. The route followed this week is supposed to be that path, and evidences of Jackson's journey mark the roads in places. Much straightening and filling has been done to make this path into a modern roadway. A 40-foot grade is common in this part of the South. Work has been pushed in every county with a part in the highway rivalry. Each county has either finished its section or has bonds or money voted to do so. Indications are such that another year will see a highway from Chicago to New Orleans by way of that bearing the Jackson title.



One route which wants to be part of the Jackson highway

Those making the trip are: W. L. Brown, Frankfort, Ind.; W. H. Crim, Salem, Ind.; Emory G. Dent, Bowling Green, Ky.; R. E. Toms, government engineer, Washington, D. C.; Charles Priest, Chicago, and W. K. Gibbs, Motor Age representative, Chicago. A Pathfinder is being used. The drive from Louisville to Nashville, 200 miles, was the most hilly part of the route to New Orleans. The drive south that day was through Davidson, Williamson, Maury and Lawrence counties. Stops were made to inspect places of interest. Delegations from Columbus met the party at the Mississippi boundary line.

The road into Meridian, the largest city in Mississippi, is of novaculite, a material from Illinois, with an asphaltic treatment, practically dustless and hard as asphalt. Citizens of Meridian accompanied the path-finding car to New Orleans.

TO MARK WATER HOLES

Los Angeles, Cal., Oct. 9—After 14 years of effort on the part of good roads enthusiasts, the government finally has appropriated $10,000 for the erection of sign posts to water holes in the Mojave desert. The matter of posting the desert was taken up by the Los Angeles Chamber of Commerce when cars first began making transcontinental trips, at which time the dry waste land formed a barrier to all except the most venturesome drivers.

In recent years the desert trail has been traversed from the East with comparative ease by motorists, but the need of guides to the water holes has been present since the first prospector perished of thirst until the present, when touring cars need water for their engines. Not only is it planned to mark the highways adequately, but to designate clearly the water supplies and keep them free from pollution.

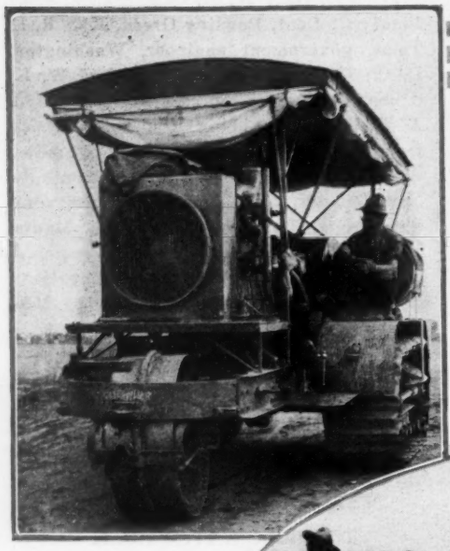
NEW HIGHWAY ORGANIZES

Midland, Tex., Oct. 6—Permanent organization of the Fort Worth to El Paso Highway Association has been completed at a meeting at Midland, Tex. Delegates and representatives from every county along the proposed route were present. Judge Penise, of Big Springs, was elected president. Affiliation with the State Highway Association and, through it, with the national body is planned. The Fort Worth to El Paso highway will cover nearly 700 miles and will connect the Southern highway connecting the East with California.

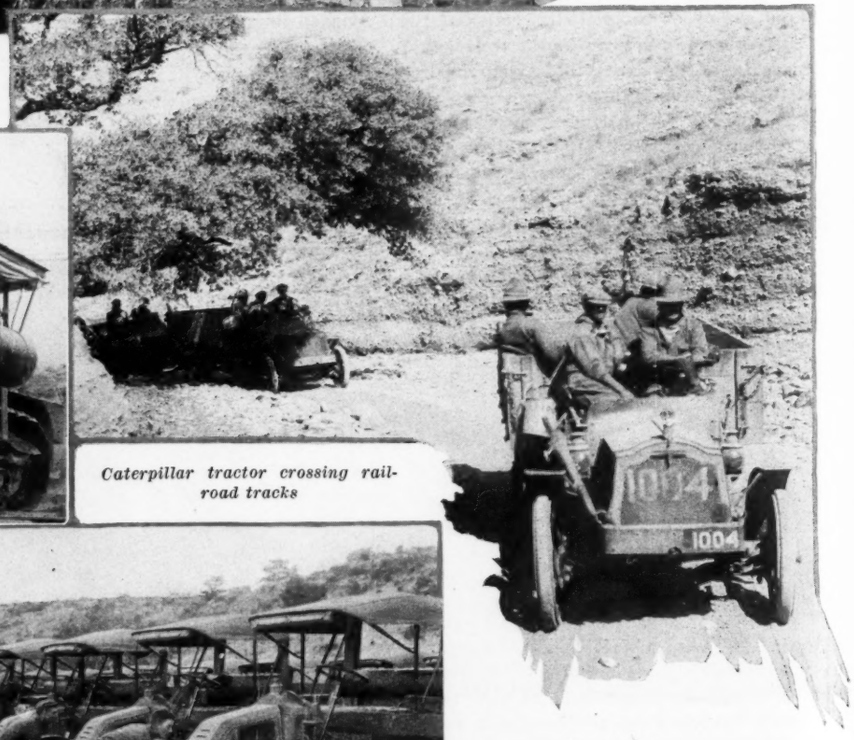
NEW MADISON SALES MANAGER

Anderson, Ind., Oct. 8—Harry S. Anderson has been appointed sales manager of the Madison Motors Corp., of this city. Prior to coming to this company he was associated with the Stutz Motor Car Co. He has long been associated with the motor car industry.

Motor Transport in Mexico



Above left—Caterpillar tractor smoothing bumps on bad roads. Above right—Trucks parked in drivers' camp. Right—Unloading supplies. Foodstuffs, ammunition for camps and forage for the horses are received daily on the border



Caterpillar tractor crossing railroad tracks

Above—Packard trucks which have gone over some of Mexico's roughest roads

Left—Cranking drill in motor-truck camp

Fitting Cars for Speed Work

How Good Touring Chassis Can Be Converted Into Fast Speedsters—A Word of Warning

By A. Ludlow Clayden

WATCHING a number of cars doing lap after lap of a board speedway at 100 miles per hour makes the attaining of such speed an apparently easy thing. At the Astor cup race it was hard to realize that something was being done that had never been done before. The winner's regular sweep past the stand was so smooth and unfaltering that there was little to suggest the prodigious stress prevailing within his car.

Why was it that Aitken was able to break the 250-mile record with his by no means new car?

Why was it that Vail's Hudson could gain and maintain its really immense speed?

Aitken broke the 250-mile record because he never had to stop. He never had to stop because he had tires that could stand the speed on the smooth board track, and because every detail of his car was so carefully prepared that it shook no adjustment loose and overstrained no bit of the engine.

There are very few touring cars that can be taken in their touring condition and run around a speedway at top speed for half an hour without something happening. Some part works loose or gets too hot and causes a drop in speed or even a stop. Any car, almost, can be made into a fair racing machine if all the details that go wrong are tackled one by one, and if a thorough job is made at every stage.

Usual Idea of Getting Speed

The usual idea of the way to get speed is to put in a special camshaft and get extra valve lift; to increase the compression and to lighten the reciprocating parts so as to permit higher crankshaft revolutions. Certainly speed can be obtained this way, but it will not be maintained unless the oil supply is arranged so that the lubricant will keep cool for hours at a time, the water circulation so free that no hot spots will develop around the valves, the spark plugs placed where they are close to water so that their points will not melt, and most of all, perhaps, is it essential that every nut, every washer and every cotter pin is fitted so well that no vibration can shake it loose.

The men who build their own racing cars, who are not connected with any factory, but buy stock parts and make a 100-mile-an-hour racer out of them, do it simply by insuring reliability. First of all the engine has to have its parts fitted more carefully than is necessary for a touring car. The bearings must be scraped in with hours of hand labor. The valve stems must be just the right tightness in their guides. Each nut and stud must be pinned or locked so that nothing short of fracture will allow it to loosen up. The pipes, wherever there are any, must be supported so that they cannot shake. The lubrication must be adjusted and readjusted till the oil is divided among the bearings in perfect proportion. The magneto must be mounted more firmly than is necessary for road driving. Having got all this sort of detail as near perfect as man can make it, experiments to raise the speed or the power can commence.

Actually, of course, the racing engines which are made as stock models by such firms as Duesenberg are designed so as to have larger valves than usual; they have the strongest sorts of steel used in them, etc. But design only gives the engine "permission" to develop high power; ability to develop that power can only be obtained by workmanship in first building the engine and painstaking care in overhauling it for each race.

Leave Too Much to Chance

About one-third to one-half of the drivers who start in a race have left something to chance; they have "thought" something or other was all right, "felt pretty sure" something would hold. These are the men who come in to the pits early and push their cars to the retired line.

There is a lesson in this for the ordinary motorist; it is the lesson that an ounce of prevention is worth a ton of cure. Work done on your car in your garage when you have the time to do it will insure against work on the road when time and inclination are both lacking.

There is a lesson for the manufacturer who is easing the rigidity of his final inspection in order to keep the shipments up to the mark. "Skimp inspection and crowd the service station" should be blazoned on the office wall of every production manager and every sales chief.

Preparation, then, will insure a racing driver a supply of power he can rely upon; the next stage is to adapt his car so that as little as possible of that power will be wasted.

First of all the gearset, the rear axle and the wheel bearings must be gone over to see that there is no friction above the minimum obtainable. The springs and frame must be so set that the propeller shaft is normally quite straight, so that the universal joints will not be working all the time and eating up power. Wind resistance must be cared for, the body width cut down as much as possible, the radiator built narrow and all the outside made smooth so there are no angles or corners to catch the air. The body of a racing car is like the hull of a yacht and every projecting screwhead adds a trifle to the resistance it offers to the wind. There has been a marked change in the "homemade" racing cars the last year and nearly every car that started in the Astor cup race had a good racing body. The Peugeots probably are at the top of the tree in this respect, but the average is not now far below the best.

It is a little hard to realize the fact that substituting a five-passenger touring body with fenders and windshield for the racing shell would easily trim 20 miles per hour from the speed. Still harder to realize that the bare chassis with just a driver's seat would be many miles an hour slower than it is with the smooth shell of the racing body inclosing all the angularities of the structure.

Racers From Modern Chassis

Any man with good mechanical ability can make a fair racing machine from a good modern chassis. If such be his ambition let him first take it to a place where he can drive it at maximum speed till something fails. Then cure the failure and fix it so that it will not fail again and continue driving till the next thing goes, keeping up the process till the maximum for the car, perhaps 60 miles an hour, can be maintained without trouble. Having reached this stage, work can be begun on the camshaft, on the carbureter, etc., till the maximum speed is increased. When the car has been worked up from a 60-mile maximum to 70 miles things will begin to give trouble again, but persistence will eventually produce a racer worthy of the name. It is a long process requiring much determination, but a racing driver's life is a matter of perpetually following this system over and over again. There is no magic in making a car go very fast, just plain, steady, hard work added to keen mechanical intelligence.

One word of warning. Few touring cars are safe to steer at anything above the maximum they will do in touring condition. Steering is affected by the angle of tilt of the front axle knuckles and by the proportionate weight on the front and rear wheels. Sometimes a leaf has to be added to stiffen the front springs, almost always taper wedges of fiber have to be cut and put between the front springs and the axle spring table to tilt the axle and give a castor action; occasionally the engine or powerplant has to be moved back a few inches to throw more weight on the rear wheels. Getting steering right is a cut and try process, but it is of paramount importance that the steering be easy and accurate for high speed driving.

From the Woman's Viewpoint

Tour-Rain of the Fascinating Name

AS the haze of Indian summer begins to show and the woods lose their leaves or paint them with many colors the woman motorist chooses her fall coats. And while she is choosing she thinks of the rainy days that must come with the sunny days and she wonders if she cannot find some one garment to fill both rainy and sunny needs. She looks and she does find one—in fact, she finds several, all bearing the fascinating name of Tour-Rain, which tells you at once what their mission in life is.

New blouses she must have and dressy separate skirts to wear at the end of the motoring. For women today do not wish to remain in the car always, nor do they wish to appear not to be dressed for the occasion when they emerge from the car's shelter. With an all-engulfing coat which protects from occasional dampness as well as from dust, she can wear her new blouses and dressy skirts and appear at a tea or in the shop without her coat, fresh and well-dressed.

The Tour-Rains are designed for this purpose. They are for sunshine and rain, roomy and warm and have style as well as utility. They belong to the family of coats that are of rain coat characteristics but at the same time possess the marks that make the more dressy coat. If a wearer of one wishes to go abroad on somewhat formal quest, she is suitably attired to do so, whether it be a tea for which she will discard her coat or an afternoon call. Should she wish to follow an informal quest before attending a function demanding somewhat more elaborate attire than usual, she may remove her coat and appear in exquisite gown, even if she has been driving in the mist beforehand and her car has been open.

The coats shown on these two pages are four of the Tour-Rain family. They have nothing to set them outside the pale of the ordinary motoring coat and have the added advantage of rainy-day prepared-

ness. In style they follow the general trend of coat fashions for fall. Convertible collars, roomy pockets, new belts and deep cuffs increase their charm.

The first coat pictured is of Priestley's English tweed, lined with Peau de Cygne lining. The big collar is worn either buttoned high or left open, according to the wearer's fancy or the contemporary weather. The new-fashioned belt may be swung around from the front to the back. It is called the "Plaza."

The second coat, "Chevy Chase," has the extremely new deep cape collar. The buttons of the collar are opened if the wearer would roll it back over the shoulders. The coat is decidedly vogue either way. The lines of the model are cut as if to remind one of college days. One might well defy the rain in this coat just to wear it on sunny days also.

When you slip on the "Ostend" you find style again, even if it is a utility coat primarily. The coat shown on the right of the first page is of English tweed in different colors and is lined with satin. Its wide collar and deep pockets are for the cold winds that come whether it rains or not while its material promises efficient service when it rains and when it shines.

The fourth coat, the "Meadow Brook," is also of tweed, Priestley's, and has a distinction all its own. Wide belt and convertible collar again appear. The belt is buttoned across the front or all around, and the collar can be made to hug the neck, one of this season's coat traits, along with the collar that stands away from the neck.

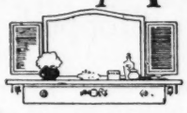
The coats are from H. Goldman & Co., Inc., New York City. Their particular claim to fame, and incidentally their name, is their "Cravenette" proof material, which their general style and cut make desirable. They are sold by your local dealers, also, though the New York house offers to fill the wants of anyone who cannot conveniently obtain them from the local dealer.

THE CAR AS A HEALTH AGENT

The day of the hot-house woman is fading into the past, and the day motoring trip is largely responsible for it. With the opening of new roads and highways as opportunities for motoring the short trip and the long trip become more common and the woman becomes more often one of the party that undertakes them.

The car as a health agent is doing its work well, for the woman who would not walk or play tennis will get out every day in this way. She even attempts the longer trip, and the day or 2-day run is no feat at all. One reason for her growing use of the car is the attention given her wishes in the design and construction. Seats and seat covering often are selected with the woman in mind. The roadster is becoming so popular largely because the woman likes to run the smaller car and selects it for the one she will drive to shop or call.

Beauty Hints for the Woman Motorist



No. 9

SOMETIMES the neck suffers more from tan and sunburn than the face. This is particularly noticeable when the dancing season arrives and the motorist who has not repaired the season's damages reaps the results of her folly.

One should not wait until the night of the evening dress arrives and then, in order to avoid patchwork skin and light frock, use a skin bleach just because it does the work instantly. A number of such bleaches contain lead or mercury, which are very injurious.

An excellent bleach is homemade, of lemon juice. This should be used every night. A lemon peel, or a thin slice, is quickly rubbed over the neck, and its continued use will remove all discoloration. If the neck is badly burned, cold cream instead should be used. And at the same time you are doing these things, the wrinkles of the neck will be removed.

Coats from H. Goldman & Co., New York

ADVICE FROM THE TOURISTS

This is the day of the woman transcontinental tourist. It is the woman often who decides whether the family shall attempt the longer trips in the car or be satisfied with roundtown motoring. Likewise, it is the woman who just now is crossing the country in roadster, touring car or special job who attracts the attention of the motoring public. From each woman advice for future trips may be obtained, for experience is the greatest teacher after all.

Some of this advice applies to all transcontinental motorists, no matter how skillful or how inexperienced. The first axiom is that preparedness is the motorist's first thought. Before starting on a tour everything necessary to car occupant's, or occupants', comfort and well-being should be done.

Other recommendations might be given as those that advise knowledge of the motor in your car; use of shock absorbers to avoid fatigue in driving and keep the physical comfort; use of standard tires with records; and a 15-minute nap when too fatigued or sleepy to drive without effort.

Several women write that an orange veil is indispensable to a satisfactory trip. The color is the best guard against sunburn and tan and freckles. A hole can be cut in the center of a large veil and the veil placed around the hat, or the veil can be worn completely over the hat. In these ways the neck and temples are also well protected. A few gathers over the nose fits the veil to the face. Chiffon is of sufficient thickness; it is the color that counts. Red is the next best color, and one of the two are advisable if the motorist wishes to avoid the harm of sun and wind.

Another woman, Miss Claire Rochester, who recently drove from New York to San Francisco, writes thus:

"Forget beauty in yourself and your car. Wear men's trousers as they are made in aviation suits. You will soon see the wisdom of this advice.

"Cold cream is a necessity. Use it lavishly—it will aid a comfortable tan.

"Be careful of mudholes. Coast into them with your motor racing. The minute you get into one use all your power on low speed to pull out of it. Using power while going into mudholes drives you into the hole as a pile driver drives a pile into the bottom of the sea.

"Eat all the wholesome food you can enjoy."

Other mistakes that women advise each other to watch are those peculiar to most beginners and many others, namely, those that come from not watching the gasoline tank and the oil and the radiator.

Russia's Motor Car Industry

War Makes Government Realize Need of Factories When Imports of Foreign Makes Are Stopped—Five New Works

NEW YORK CITY, Oct. 9—Russia has decided to develop a motor car industry of her own. The European war is the cause of her decision. Most of Russia's cars have been coming from Germany, France, Italy and England, but the war has demonstrated to Russia how necessary factories for the manufacture of motor cars are and five new factories already have been started. The government is largely responsible for the activity. Government arrangements call for 7,500 trucks and cars from these five factories in a given time. It will mean 1,500 vehicles from each. The minister of war has placed orders for all the output. Nicolas Kouznet, an engineer of Petrograd, is now in the United States, investigating motor conditions for Russia.

The new factories are: Axaj. Co., Rostov-on-Don; V. Lebedev Co., Jaroslav; Russian Reno Co., Rybinsk; Riabushinsky and Kouznetzoff Co., Moscow, and the Russo-Baltic Car Works, Moscow.

Cars to Be Russian Made

The cars to be manufactured by these concerns will be almost entirely of Russian make. Only a few of the necessary parts not yet manufactured in Russia are permitted to be imported; for instance, magnetos, spark plugs and ball bearings. To enable the factories to fill their orders, a number of auxiliary plants are being established in Russia for the purpose of manufacturing different supplies. Each of the factories has adopted some foreign type of car to be used as a model, with the exception of the Russo-Baltic Works, which will build its own type and which has been supplying the entire Russian market for a number of years with its cars.

The Reno factory will build a model after the French style.

Riabushinsky & Kouznetzoff will follow the Italian plan of Fiat.

Lebedev will build after the drawings of the English works of Crossley.

The Axaj works have not decided as yet what type they will manufacture. All the works mentioned above are erecting buildings at present, and some of them already are beginning to equip their factories. Some of the factories have sent their representatives to America, authorizing them to order and purchase the necessary equipment for the new factories.

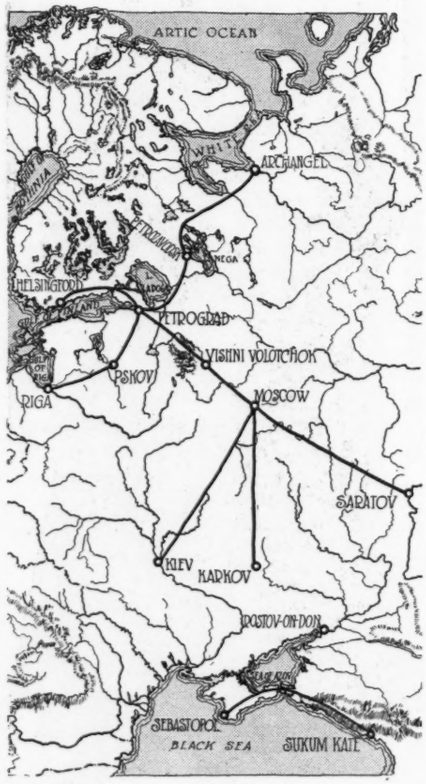
Russia is a country of great distances, of great agricultural areas and great forest areas. That part most favored for motor car use is in the central vicinity, surrounding Moscow, and in the large agricultural areas extending in all directions south of Moscow. When you get within 200 miles of Black Sea the country becomes sandy and is not so favorable for motor car use.

Naturally the cars will be used more in the large cities which are at present well stocked with European models. Good roads radiate from the cities. From Petrograd to Moscow, 450 miles, the distance can be covered in 2 days easily. In a race it was covered in 9 hours and 20 minutes at 48 miles an hour. When touring it is customary to stop at the small town of Vishni Volotchok, which is a midway point. The country between Petrograd and Moscow is largely covered with forest.

Some Good Macadam Roads

From Petrograd to Helsingford in Finland there is a good macadam road and the trip can be made in 8 hours.. From Petrograd to Paskov, which is in the direction of Austria-Hungary, a good macadam road offers an 8-hour trip between the two cities. From Pskov to Riga there is a good road. Riga was the home of the biggest Russian tire factory, Prowodnik, which soon after the outbreak of the war was moved to Moscow, where only recently the manufacture of tires has been commenced in the new factory.

Very recently a motor car test has been started from Petrograd to Archangel, the port on the White Sea. The road leads by way of Petrozavodsk on Lake Omega.



This map of Russia shows the roads mentioned as being well built and of macadam. They seem far between, but the added impetus to the car industry is expected to unite them by like roads

More good motor roads radiate from Moscow, which is centrally located, than from Petrograd. Leading to the south are good highways to Kiev, to Kharkov and to Saratov. That part of Russia lying to the north and east of Moscow is generally covered with great forests and the use of motor cars is very limited.

There are some good roads in the southern part of the country, one in particular leading from Sebastopol on the Crimea, the center of the Crimean war of 70 years ago, to the east. This road is very scenic and leads as far as Sukhum Kale on the eastern end of the Black Sea. Perhaps the best roads in all Russia are to be found in Poland, which is now in the hands of the Germans.

Rich Farmers Offer Market

There will doubtless be a good market for motor cars among the wealthy farmers of Russia. The farming class roughly divides itself into large farmers, known as Pameshik, and small farmers, known as Mujik. The former are large landowners who can afford to buy several motor cars and many farm tractors. They have huge areas of land, estates being as large as some of the smaller states in the U. S. A.

The Russian government has already realized the necessity of motor power on farms and has ordered twenty-three different makes of American farm tractors. These are the latest types, and the Russian minister of agriculture has purchased them with the object of studying the tractor situation. Undoubtedly these will be but the forerunner of large orders of U. S. A. tractors. It is not impossible to conceive the time when factories will be started in Russia under government stimulation to build farm tractors.

To popularize tractors with Russian farmers the Russian minister of agriculture is at present planning to form ten special tractor squads, whose duty will be to demonstrate tractors to Russian farmers in different sections. Each squad will have five tractors at his disposal. In order that these demonstrations may be successful and that the tractors will be well handled the government is organizing special classes for teaching the mechanics of tractors. It is a part of the plan to purchase 300 tractors during the coming year.

Besides agricultural tractors the minister of war is especially interested in all kinds of tractors used for the purpose of transporting artillery loads. During the present war the tractors have proved to be invaluable and have already replaced the

work done by horses in a number of branches of industry.

For the last 2 years, due to the war, Russia, being a farming country, has been suffering a shortage of laborers and especially horses for all kinds of agricultural work. The lack of horses and of the possibility of getting them 4 years ago raised the question of finding new methods of agricultural work. The only way out of the critical situation is the introduction of tractors, which will play an exceedingly important part as a substitute for horsepower.

Altogether, Russia has about 20,000 miles of state road and 475,000 miles of country road. The distribution of roads among provinces is, in miles, as follows: Moscow, 1,500; Petrograd, 1,200; Warsaw, 1,100; Grodno and Tifles, 1,000; Ekaterinoslav, 950; Volyn, 800; Petrokov, 700; Tavrichevsky, 650. All other provinces have less than 600 miles of state roads.

State Roads in Russia

The wealthy landlords have been mentioned already as potential buyers of cars. Among the classes of landowners, they have a majority. Fifty-two per cent of the land belongs to noblemen, or wealthy landowners; 25 per cent to peasants; the remainder is owned by merchants and others of the middle class.

Whether Russia can keep pace in gasoline production with the growing car industry remains to be seen. The total production of gasoline now is 200,000 tons. Russia also produces 1,400,000 tons of kerosene. The price has been affected in both products by the war. Gasoline has advanced from 23 and 33 cents a gallon, according to quality, to 30 and 40 cents a gallon, while kerosene is now 10 cents a gallon, 2 cents higher than before the war began.

BELGIAN ENGINEERS VISIT U. S.

New York, Oct. 7—Two of the leading engineers from one of Belgium's largest motor car, motorcycle and ammunition factories arrived in this country recently for the purpose of making manufacturing investigations and doing engineering work here. Both were engineers in Fabrique Nationale, the large factory at Liege, which previous to the war manufactured F. N. motor cars, motorcycles, etc. Paul Kelecom and Julian Perrier were connected with the engineering department of the F. N. factory after 1905. The F. N. factory was closed on August 3, 1914, and since that date has been practically deserted. Over $1,300,000 worth of machinery has been removed from the factory by the Germans and taken to Germany. The factory is now used as a field repair depot by the Teutons. Previous to the war the F. N. factory was building 1,200 motor cars a year and upwards of 4,000 motorcycles. In addition to this there was a great deal of small firearms manufactured. Over 4,000 men were employed.

Vigilantes and Car Thieves

Epidemic of Losses in Larger Cities Suggests Old Time Method of Handling Problem

CHICAGO, Oct. 6—The epidemic of car thievery in the larger cities of the country has brought on the discussion of the advisability of having a committee of vigilantes such as the frontier had in the day of unsettled history. Thousands of cars are driven off and so wrecked or changed that their identities are lost before the owners are started fair on the track or their stolen property or can make public a description of their lost property.

The vigilance committee suggested is to consist of a committee large enough to be on duty nightly in the business districts of a large city. Any stranger approaching a car or any man taking away a car known not to be his own property is to be arrested or shot, if necessary. In other words, the vigilantes would treat car thieves as if they were no better than horse thieves and on the same plane as the outcast of society.

Owners are becoming tired of the general practice of calling those caught with cars "joy riders" and those who are not caught "thieves." The distinction is an old one, but while it is being observed car owners are suffering the loss of their property and wielders of the law are thinking up new ways to see what can be done to stop the taking of cars.

Owners Want New Method

Before the day of the motor car, horse thieves were caught and punished with the heaviest sentence of the law in well-settled regions and with the rope of the vigilantes in new sections of the country. In those days the thief of the horse, then man's chief standby, was ostracized and treated as the lowest of the low; today, claims the deprived owner who has sought in vain the sympathy of the authorities, the car thief is only a joy rider and is guilty of no wrong other than that of driving away the car of some "millionaire" who has carelessly left his machine standing in the streets.

One judge, it is said, recently let a thief go on the theory outlined in the preceding paragraph, that of joy rider and millionaire. That his attitude was not that which considers the owner, also, was proved when the next day his own car was stolen and he was giving a personal verdict in a case of his very own.

Just what recognition the law itself would give to the vigilance committee suggested is uncertain, there being those who would dub it as tainted by the mob spirit and in discord with civilized times. However, if the plan could be worked out, either in its entirety or in part, so that it would not conflict with the purpose of present provisions for law and order, fear might be thrown into the so-called joy riders who, through the apparent ease of their widespread activities, promise to develop into systematic thieves of the first class.

MOTORISTS PROTECT THEMSELVES

Seattle, Wash., Oct. 7—The Motor Vehicle Protective Association was launched in Seattle, Wash., recently and has already enlisted many hundreds of Northwest motorists. In plan and scope the association is unique, providing its own motorcycle patrol to watch all highways, small towns, big cities and important points in the scheme of thief apprehension, the main purpose of the organization.

TELLS HOW THIEVES WORK

St. Louis, Mo., Oct. 6—Ora Lewis, the leader of a band of three brothers, who are held here charged with murdering two policemen, growing out of their activities as automobile thieves, has told how machine owners can prevent thieves from taking their machines. He laughed at the suggestion that safety locks, plates and other devices bother expert thieves. His remedy, as he told it to Chief of Detectives Allender, in the presence of reporters, is:

"Just cross your spark plug wires. Cross two of them and the cylinder won't hit. It will take a thief hours to find out what's wrong, but it won't take the machine owner but two minutes to cross the wires and make his machines safe."

This theory of Lewis' is based on his principle that the success of an automobile thief depends upon a "quick getaway."

MICHIGAN CARS TOTAL 143,550

Detroit, Mich., Oct. 6—Registration records for the first 9 months of 1916 show that up to September 1 143,550 motor vehicles were registered in Michigan. This total is 28,705 greater than the total Michigan registration for 1915 which was 114,845 cars. It means that 25 per cent more cars have been registered in 9 months of this year.

Because the license fee from September to February is only one-half of the original price it is believed by officials of the state that by January 1, 1917, the total registration for the state will be between 155,000 and 160,000 cars.

Of the 143,550 cars thus far recorded there were 133,354 passenger cars and 10,196 commercial vehicles, the increase being especially strong for the latter class.

Wayne county, in which Detroit is located, had 41,375 cars to its credit out of the 143,550. This is 10,348 more than the number in the county at the end of 11 months in 1915.

Quick Starting in Cold Weather

The Problem of Getting Gasoline Vapor Into Cold Cylinders

By Wallace B. Blood

THE vaporizing proclivities of gasoline increase in direct proportion with the heat which surrounds the gasoline. So, for the same reason, gasoline vapor will stay suspended longer, that is it will not condense when once vaporized, when it is within a warm container. There is no mystery connected with the obstinacy of a cold motor to start. Gasoline is a very volatile liquid and will vaporize at comparatively low temperatures. It will condense just as rapidly unless the temperature is brought up, and this condensation in cold motors is the root of most of the evil.

Raw gasoline vapor is better for starting when the manifold and cylinders are cold than a mixture of gasoline and air. That is the function of the choker. Of course, a certain amount of air must enter the cylinder, even with the choker closed, because the gasoline will not burn without oxygen and the oxygen comes from the air. The reason a rich mixture is superior to a lean one for cold-weather starting is because there is more gasoline in the mixture; with an even temperature the condensation will be constant, and so there is a greater surplus of gas that will not condense. Furthermore, with the choker applied, there is a greater suction concentrated on the gasoline and it is this increased suction that draws the vapor from the liquid in greater quantities.

For the same reason it is an assistance to cold weather starting to prime the motor. The gasoline is then right on top of the piston where the first bit of vapor will be fired by the plug. It does not have to be sucked through a long cold manifold which may condense all of the gas before it gets to the cylinders.

In the article on preparing the car for winter driving published in last week's issue of Motor Age, the point was brought out that the car should be provided with some means of getting gas to the cylinders on a cold morning so that it would not be necessary to run the starting motor for a period to exceed 30 seconds. An attempt was made to make it appear reasonable that 15 minutes of preparation before stepping on the starting pedal was more economical than running the starting motor 2 or 3 minutes. The storage battery, like a human being, has a fatigue limit, it can stand up as long as it is fed, but when its strength is gone, it has to go to the charging hospital for recuperation. The electrical system is not at fault. It is the gasoline system that must be looked to.

On a great many of the modern cars, when the carbureter is properly adjusted and the choker is applied the motor will start on the coldest morning without trouble. On some of the older models, with old designs of carbureters, which used to work successfully with the higher grade of gasoline that was obtainable 3 or 4 years ago, this is not the case and it is these cars that need the doctoring.

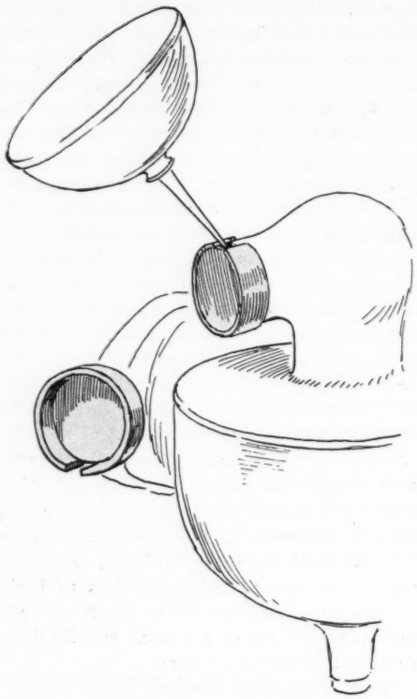


Fig. 1—Home-made choker, also useful for admitting carbon remover

First of all, a carbureter has to be adjusted for a richer mixture in winter than in summer for the reason explained above. Let us consider the worst case possible and go through all the steps necessary to start that worst motor.

First, the air valve of the carbureter should be closed. If there is no choker valve, stuff a piece of cloth into the air intake. Soak the cloth in gasoline as an added inducement for the cylinders to take food. Then prime the motor. If there are no priming cups, remove the spark plugs and pour gasoline through the holes, or buy a set of the combination spark plugs and primers that are on the market. Then wrap the manifold with a large turkish towel soaked in boiling hot water. Leave the towel on for a minute or so; then step on the starting pedal. If all these prescriptions fail, there are three other possibilities: The intake valves are not opening wide enough, the mixture is altogether too lean, or the carbureter is antiquated—it will not vaporize the present low grade of fuel. Remedies are, in their respective order, to take up the play in the intake-valve stems, to turn up the needle-valve adjustment, and to buy a new and modern carbureter.

In Fig. 2 is illustrated a simple sketch of a priming device which may be operated from the seat. This is applicable to many makes of cars, may be easily constructed by the car owner and is a great time saver. It consists of an ordinary tin can, the device which the writer saw had an olive oil can, copper tubing, three brass tees, a brass L-valve and a small solid rod.

The tank is fastened to the dash board with metal bands and a union is soldered into the bottom of it into which is inserted a copper pipe, ¼-inch is a good sized pipe to use. This pipe leads to an L-valve the horizontal outlet of which is slightly above the top of the priming cups. From this outlet extends a copper pipe to a tee over the first priming cup; from the other end of the tee is another copper pipe to another tee over the next priming cup, etc. The tubing assembly is held rigid by bands of flat strap iron which are bolted under the cylinder-head bolts and wrapped around the pipe as shown at A. This makes a very rigid construction.

A piece of ¼-inch iron rod bent in the shape shown in the sketch, is flattened out at each of the priming cup levers, drilled and fastened to the lever with cotter pins. To prime the motor it is only necessary to pull the lever on the back side of the dash and the valve below the tank and the prim-

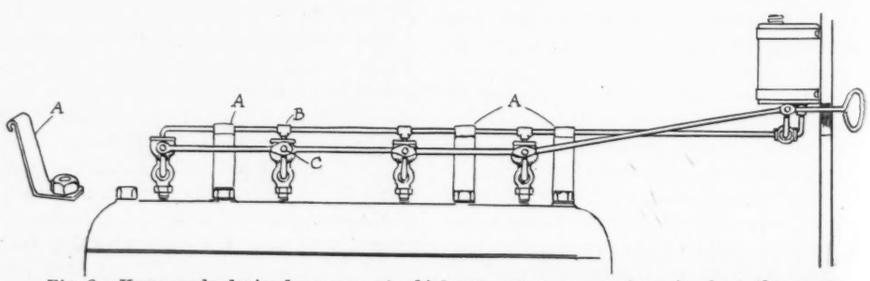


Fig. 2—Home-made device by means of which all cylinders may be primed at the same time from the driver's seat

ing valve are all opened at once. This feeds the cylinders in a hurry. It is also useful in inserting liquid carbon remover into the cylinders, the carbon remover being placed in the can in place of the gasoline.

The device illustrated in Fig. 1 is an affair made by an owner of an old model which had no choker equipment. It is nothing but a disk of ⅛-inch flat iron around which is wrapped a strip of flat iron, the inside diameter of which is a close fit over the air-valve horn. A space of about ⅜-inch is left open as shown. In starting the device is slipped over the valve horn, and pushed up tight against it, thus closing the air supply. The owner left the slit in the top so that he could apply the kerosene carbon cure by squirting the coal oil from an oil can into the slit. This is the best way to use kerosene for purposes of carbon removing, as the substance enters the cylinders in vapor form and will not dilute the lubricating oil as it is liable to when poured directly into the cylinders.

A number of Motor Age readers have written in asking if the plugs which have recently appeared so abundantly on the market—the ones screwed into the intake manifold—are useful for cold weather starting. They are not. It is not their function. These plugs are designed to assist the carbureter when the motor is driving at 15 miles an hour or over and do not stop operation until that time. The only way they could possibly help would be that the mixture might be adjusted slightly richer, but we doubt whether even this would be practical.

MILE POSTS OF REDWOOD

San Francisco, Cal., Oct. 9—The Lincoln highway between Salt Lake City and San Francisco, Cal., will be marked with redwood posts. There will be one post to each mile, the distance between these two points being 1,000 miles. These posts will carry the usual sign indicating that it is the Lincoln highway.

The posts will be set rough and will require no painting to protect them from the weather.

The Lincoln highway commissioners had under consideration the use of boiler tubes and redwood was selected in preference. The boiler tubes would have to be set in a cement base, making it expensive to install, while the tubes themselves would not last nearly as long as California redwood. The rot-resisting quality of redwood will make these posts good for 50 years, without any sort of protective coating either in the underground portion or that exposed to the sweep of the weather. Deep into the surface of each post will be stenciled the inscription, "Redwood from California's Big Trees."

Dyke's Motor Model for Instruction

Operates by Turning Starting Crank

A. L. DYKE, of St. Louis, one of the pioneers in the motor car supply business and publisher of Dyke's Automobile Encyclopedia, has recently perfected a six-cylinder engine model for instruction use which is as clever in its makeup as it is valuable in teaching the operation of a motor car powerplant. This model is the seventh of a series which includes a single-cylinder engine, magneto, carbureter, differential, clutch and gearbox.

At a glance this model, which is made up of cardboard and metal, will teach a person the name, purpose and location of all parts of an engine; how the parts operate, and the relation of one to another, in fact, shows a cutaway view of every part in operation. For instance, when the starting crank is turned, the crankshaft gear turns the camshaft which operates the camshaft. The camshaft with its twelve cams is actually turned and the valves are lifted at the proper time. As an example the student can place the piston in No. 1 cylinder on the power stroke, then refer to the chart on the side of the model and see just what all other valves, cams and pistons are doing.

In addition to learning all about the parts of the engine and their purpose, such subjects as correct valve timing, and firing orders of 4, 6, 8 and 12-cylinder engines are made perfectly clear.

The eight and twin-six engine principle is made easily understood with these models. The eight uses the same crankshaft as the four and the twelve the same as the six.

With the four and six-cylinder engine models there are included charts of different parts, such as the starting motor generator, a modern ignition system, inlet and exhaust manifold clutch, gearbox and drive system to the rear axle. With these charts placed on the working models, one can see just how they are applied to the regular motor.

The moving parts of the models are metal. The camshaft is operated by a brass gear which in turn is operated from a gear on the crankshaft. The cams which operate the valves are accurately set.

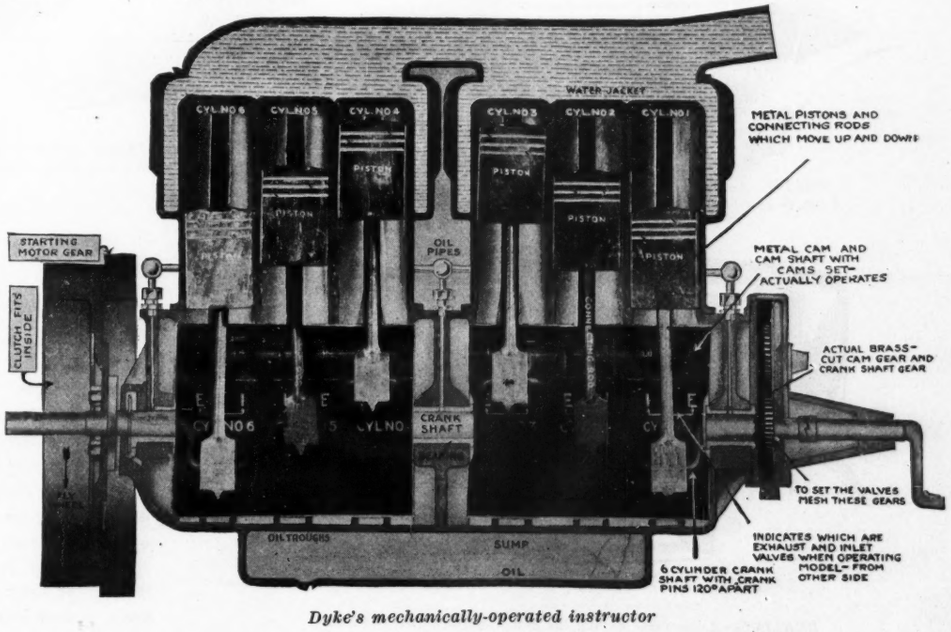
The size of the six-cylinder model is 11½ by 11 inches, and the four-cylinder 9¼ by 11 inches. Prices are $3 and $2.50 respectively. The manufacturer is A. L. Dyke, Publisher, Roe building, St. Louis, Mo.

A. A. A. TEST OF MYLE-MAKER

Chicago, Oct. 10.—A Ford car equipped with a Myle-Maker carbureter attachment, with top and windshield up, and four passengers, weighing with the load 2,267 pounds, made 26.6 miles on a gallon of gasoline, in the presence of F. E. Edwards of the technical committee of the American Automobile Association.

The car used had only been run 278 miles, and was picked at random. The gears on the speedometer were gone over by the Stewart Warner Speedometer Corp., and the instrument thoroughly tested for accuracy.

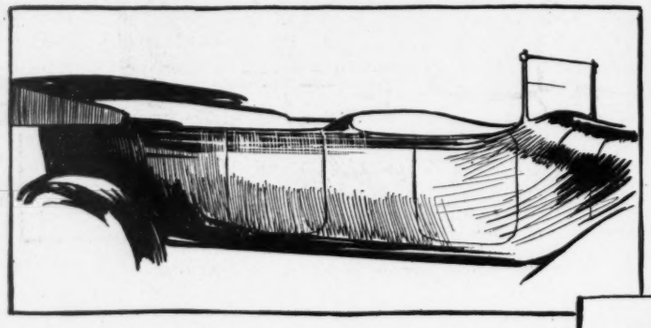
Before the instrument was attached the same car, with the carbureter adjusted for greatest economy, covered just 22½ miles on a gallon. Both tests were conducted under exactly the same conditions. The tests showed an increase of 18.22 percent in the gasoline efficiency with the Myle-Maker attached.



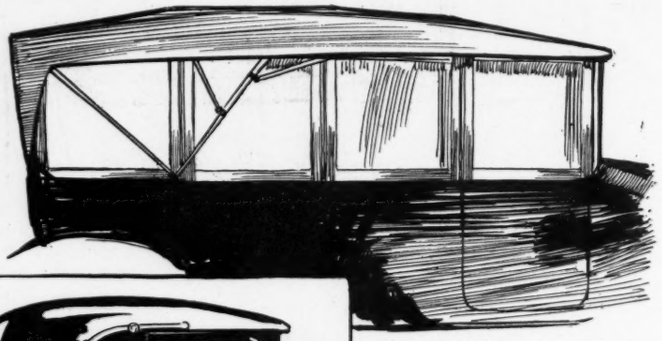
Dyke's mechanically-operated instructor

Motor Car Body Names and Their Meanings Which

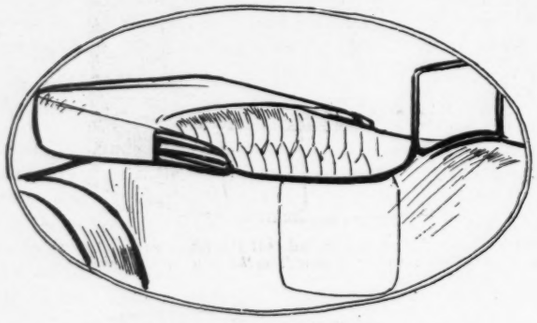
Standard Superstructure Terminology Illustrated



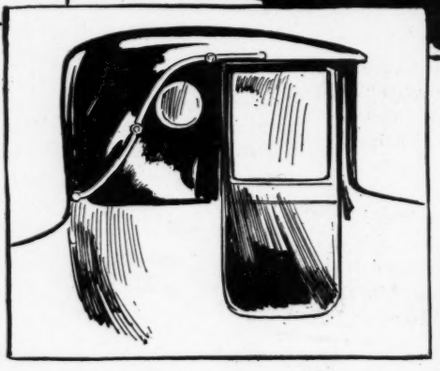
TOURING CAR—An open car seating four or more with direct entrance to tonneau



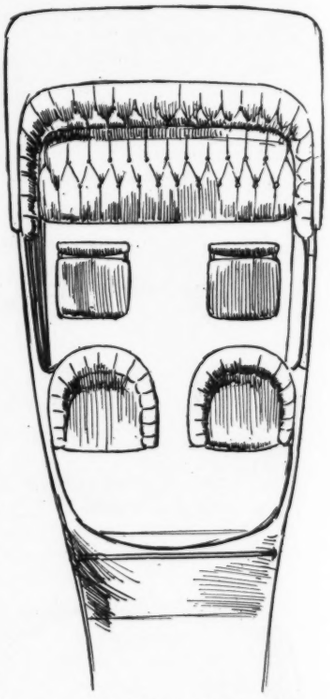
CONVERTIBLE TOURING CAR—A touring car with folding top and disappearing or removable glass sides



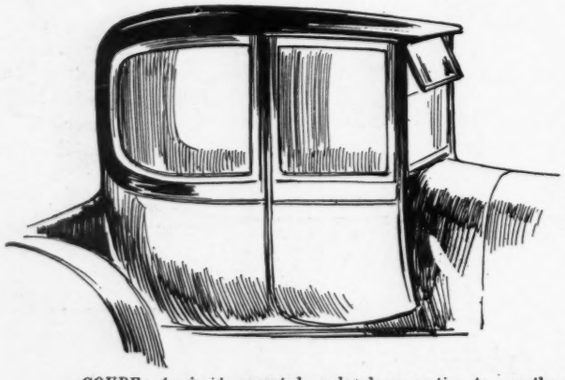
ROADSTER—An open car seating two or three. It may have additional seats on running-boards or in rear deck



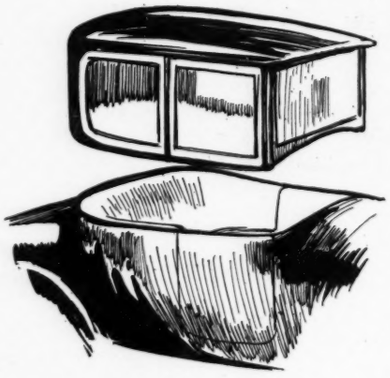
COUPELET—Seats two or three. It has a folding top and full-height doors with disappearing panels of glass



SALON TOURING CAR—A touring car with passage between front seats, with or without separate entrance to front seats



COUPE—An inside operated, enclosed car seating two or three. A fourth seat facing backward is sometimes added



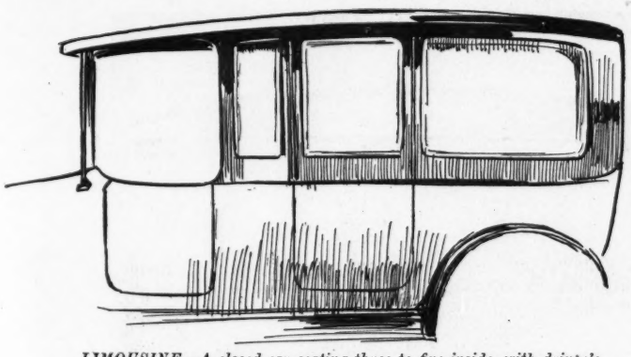
CONVERTIBLE COUPE—A roadster provided with a detachable coupe top

BERLINE—A limousine having the driver's seat entirely inclosed

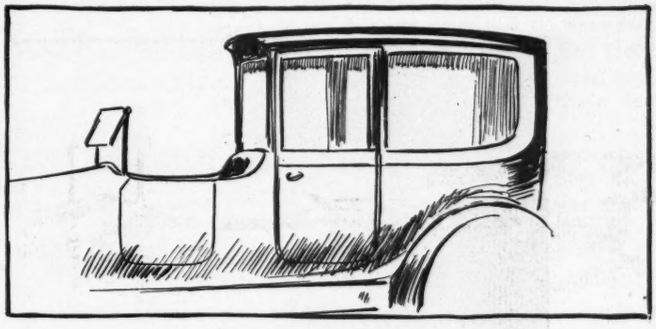
STANDARD BODY NOMENCLATURE

There has been a lamentable lack of uniformity in the methods of naming body styles as practised by car manufacturers. In some of the closed cars, the same name applies to one type when produced by one maker and to an entirely different style in appearance and seating arrangement when it comes from the factory of another. The Society of Automobile Engineers has taken a long step in clarifying the atmosphere by settling upon a standard nomenclature for the different body types, and it is expected that car makers in the future will adapt their terminology to it. The S. A. E. standard body names are illustrated and defined on these pages.

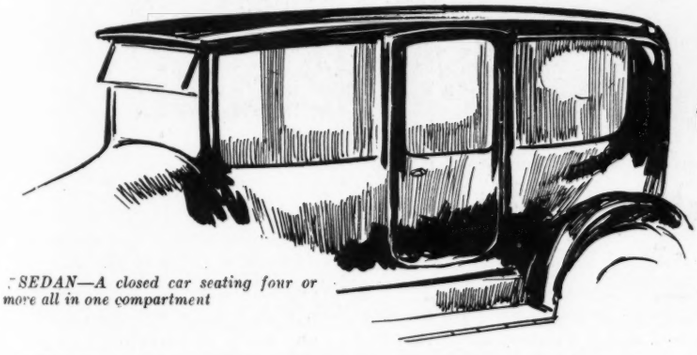
Will Relieve the Present Haziness of Classification



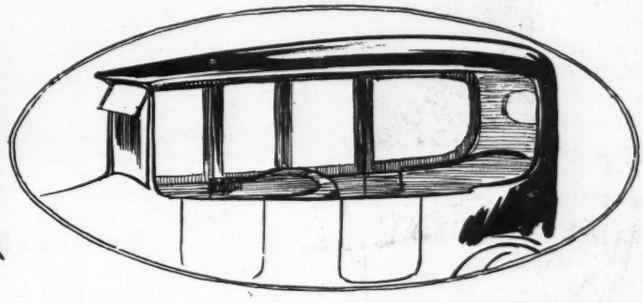
LIMOUSINE—A closed car seating three to five inside, with driver's seat outside, covered with a roof



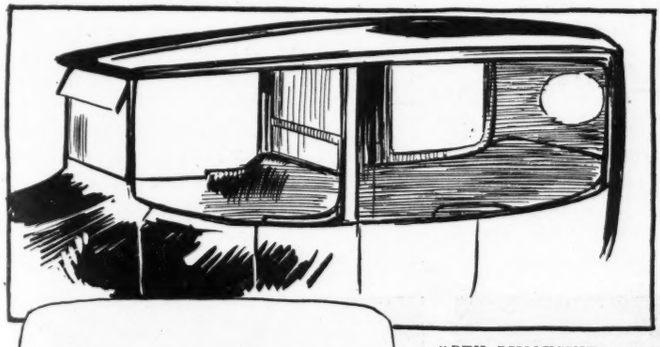
BROUGHAM—A limousine with no roof over the driver's seat



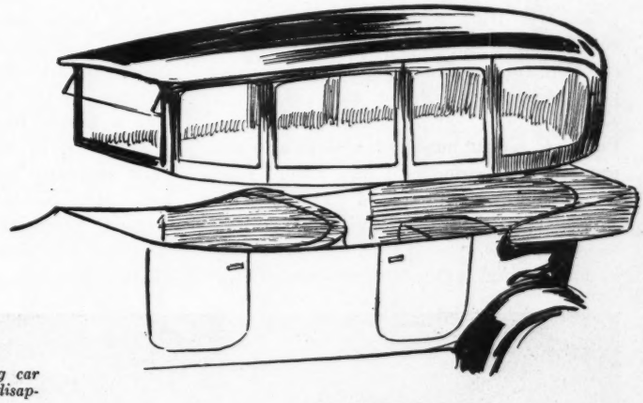
SEDAN—A closed car seating four or more all in one compartment



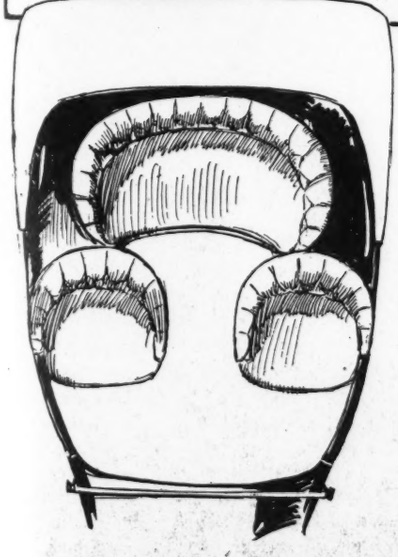
OPEN SEDAN—A sedan so constructed that the sides can be removed or stowed, so as to leave the space entirely clear from the glass front to the back



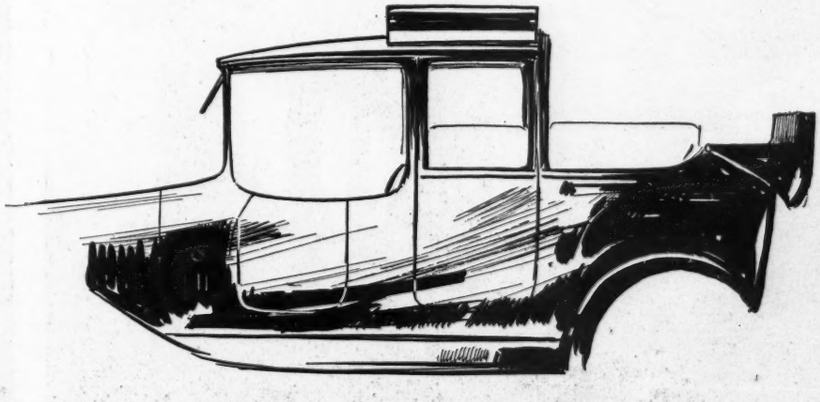
OPEN LIMOUSINE — A touring car with permanent standing top and disappearing or removable glass sides



CONVERTIBLE SEDAN — A salon touring car provided with a detachable sedan top



CLOVER LEAF—An open car seating three or four. The rear seat is close to the divided front seat and entrance is only through doors in front of the front seat



LANDAULET—A closed car with folding top, seats for three or more inside, and driver's seat outside

Land Yacht Woman's Home

Pullman motor vehicle for de luxe touring

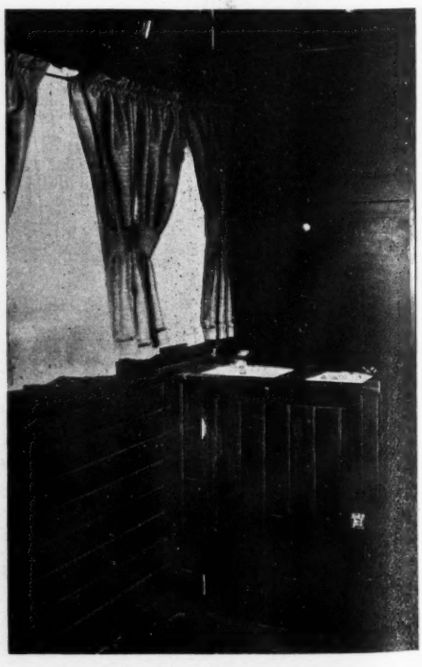
By Charles A. Byers

WISHING to travel in truly leisurely fashion while sightseeing in out-of-the-way places, and at the same time desiring to be surrounded with practically all the comforts and conveniences of the modern home, a woman of means and enterprise, Mrs. Ruth Kohler, Fresno, Cal., has recently had designed and built a motor car that for ingenious planning and equipping is perhaps without an equal in the country. The car is actually a private Pullman, on rubber-tired wheels and self-propelled. Its enclosed and roomy interior, resembling a fair-sized living room, is elegantly finished and furnished, and with its seats, beds, closets, wash bowls, shower bath, running water and numerous other conveniences it is virtually a touring palace. Traveling long distances by motor car has become extremely popular during the last few years, and many uniquely designed travel cars have appeared in consequence, but one would go a long way, indeed, before finding another so well adapted to the purpose as this car.

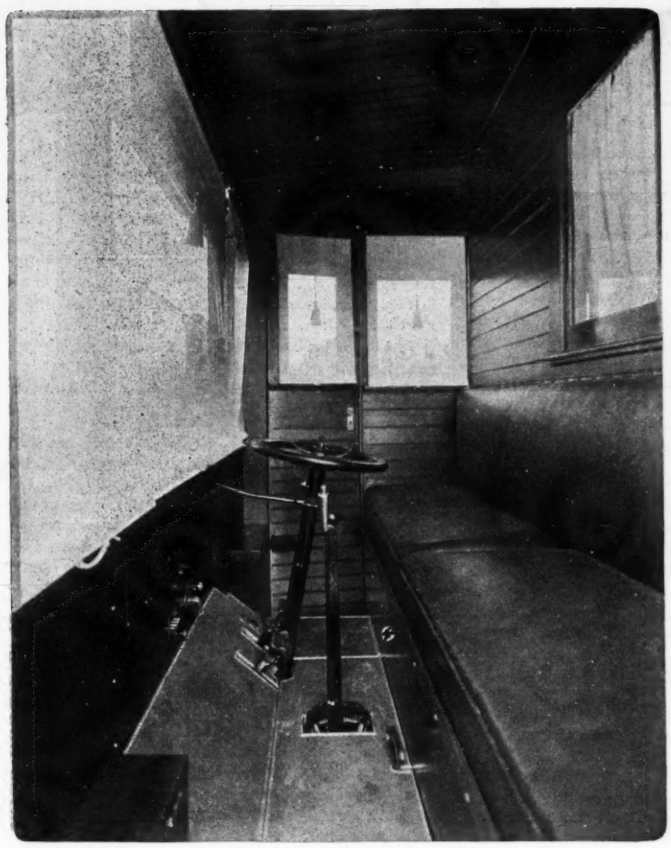
Not a Motor Bus

This car, in no sense a motor bus, is built expressly for touring and for private use. Mrs. Kohler, accompanied by a few friends, plans to take long jaunts into many of the scenic out-of-the-way places of the West in the summer season, and next year will make a tour across the continent. She is especially anxious to be able to stop wherever there is anything to interest her, and during such stops, as well as en route, she will be as comfortably situated as any mode of traveling can possibly permit. Her first trip, upon which she went last summer, took her from her home in California into Washington and Oregon, and lasted a period of several weeks.

Designed so that the whole interior may be closed, including even the driver's compartment, the travelers will have nothing to fear from inclement weather. The numerous windows, enabling an excellent view of the country from every angle, are of



Above—Interior of car showing wardrobe closet and dresser. Right—Sink and washbowl with cover raised. The lower part is used for dishes



Driver's compartment can be made into bed

the car type, which therefore may be opened or closed as desired. In the ceiling are also two ventilation vents, and two electric-light globes in the living room and another in the driver's compartment supply the interior with artificial light at night. The car is piped for running water, which includes the shower, and the water is supplied from a 50-gallon tank in the roof, which is filled from above. The electric wiring provides connections for various electric cooking equipment, which enables a meal to be prepared and even served while traveling, and there is also an electric stove, designed to be brought into service whenever the condition of the weather makes heat desirable. A small individual motor is included in the equipment for the sole purpose of supplying the lighting, heating and cooking systems, and embraced in this novel arrangement is also a water heater. It is therefore seen that not even a modern home is any better equipped for continuous living.

Driver's Compartment Roomy

The driver's compartment, which is especially roomy, extends across the entire front, with a window and a glass-paneled door on each side and three windows on the front. A leather-cushioned seat extends the full length of the space, and this seat is so designed as to be convertible into a comfortable bed for the night.

Back of the driver's space is the so-called living room, which is 8½ by 12 feet. In this room are two long, comfortably-upholstered seats, and each of these may be converted into a double bed of nearly full bed-room size. In the rear end are a dresser and a wardrobe closet, and in the front end are the shower and lavatory room and a cabinet containing wash bowl and sink and storage space. The dresser includes three drawers and a plate-glass mirror, with a small cabinet above, and the closet is provided with the usual shelves and hangers, as well as hat boxes. The shower room is ordinarily equipped, including lavatory fixture and a cabinet of shelves, and in the other combination of features of this end of the room are, as previously stated, both a wash bowl and a sink, which conveniences are provided with a hinged covering that, when lowered, serves as a very excellent table. In the bottom part of this cabinet are kept the dishes and the cooking utensils.

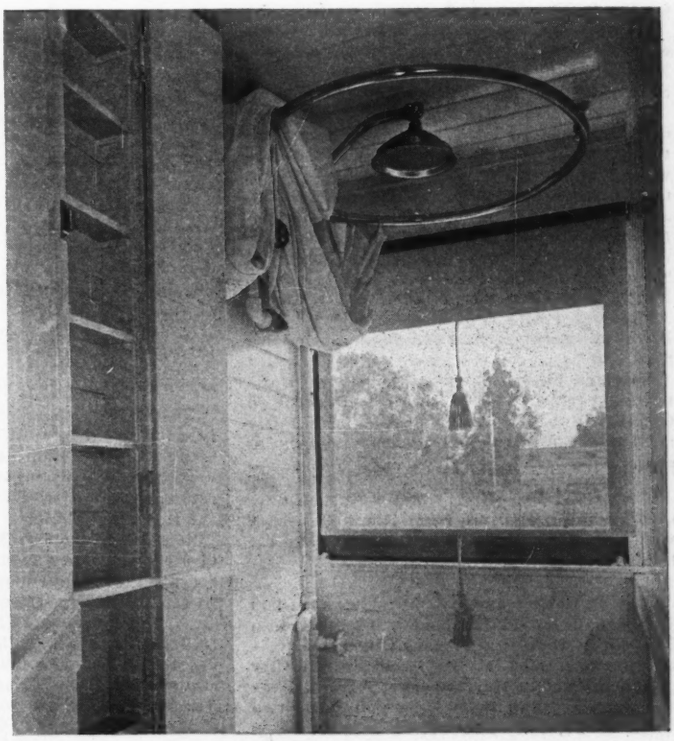
Across the middle of the room is extended a brass pole on which are suspended heavy curtains to enable its being separated into two sleeping compartments, or to shut off one-half from the other when a meal is being prepared or to permit dressing.

The interior woodwork is of Juanacosta, or Mexican mahogany, except in the shower room, where it is of pine enameled white. The floor of the shower bath, as well as the base, is of cement, and the floor of the main room is richly carpeted. Blinds and net curtains are used at all windows and doors, and at the sides of the windows are also drapes to match the center curtains. These drapes and curtains are of grayish buff materials, and the seats are upholstered in plush of the same color. Blinds are also provided for the windows of the driver's space and the shower bath. Access to the main room is had from the rear, and a window, which may be lowered, is set into the partition in the front end.

The car was built, from special plans, by the Moreland Motor Truck Co., Los Angeles, and the total cost was about $5,000. The body, which embraces these novel features, is constructed on the ordinary 2½-ton Moreland truck chassis. The car is of the worm-drive type, and distillate is used for fuel. Underneath the body are several cabinets of different sizes, in which are carried tools and various camping equipment. In one of these is a folding camp stove, intended for use in the open when a more elaborate meal than can be prepared on the electric stove is desired. In fact, no detail has been overlooked or slighted to make the car a complete home, on wheels, in every way.

TRUCKS FIGHT FOREST FIRES

Los Angeles, Cal., Oct. 7—The motor truck has been playing an important part in fighting forest fires in southern California this season. For quick transportation of men from menaced point to point, the truck has proved invaluable and hundreds of acres of valuable timber land and ranch property have been protected by its use. In a struggle against the flames that threatened the Santa Fe railroad in the Cajon pass, near San Bernardino, the trucks were used to haul enormous quantities of sand that proved an effective weapon against the flames.



Provision is made for a shower bath

Routes and Touring Information

Rockford, Ia.—Los Angeles

ROCKFORD, Ia.—Editor Motor Age—Kindly advise how late in the Fall it is safe to make the trip to Los Angeles, and what road is best to take? Would it be safe as late as November 1st?—F. L. Thompson.

In going to Los Angeles, there are two main routes that you can take; one is to go west through Mason City, to Algoma, then south through Ft. Dodge, and Grand Junction, and through Dennison to Omaha, then from there go west either over the O. L. D. Trail or the Lincoln Highway, to Denver. Then south through Colorado Springs, Pueblo and Santa Fe, to Los Angeles.

The other way is to go from Rockford to Mason City, then south through Iowa Falls to Des Moines, then over the Inter-State Trail to Kansas City, there taking the Santa Fe Trail and going west through Pueblo and Santa Fe. From Santa Fe, your route lies through Springerville, and from there you have the choice of two roads, one going through Phoenix, to Los Angeles, and the other going via the Grand Canyon out to Los Angeles. The northern route through the Grand Canyon has the big attraction of one of the wonders of the United States, while the southern route through Phoenix has slightly better road conditions.

Volume 5 of the Automobile Blue Book will give you complete running directions for either route.

Ypsilanti, Mich.—Miami, Fla.

Ypsilanti, Mich.—Editor Motor Age—Kindly publish the best route from Ypsilanti, Mich., to Miami, Fla.

I expect to drive down some time in January. What condition would the roads be in at this time?—Mrs. C. D. Stevens.

In going from Ypsilanti, Mich., to Miami, Fla., we advise that you go via Stony Creek, Milan, Dundee, Ida, to Toledo. From Toledo go west through Crissey to Wauseon, and south via Napoleon and Ottawa, to Lima, O.

From Lima, go via Wapakoneta, Sidney and Piqua to Dayton, and via Miamisburg, Monroe, Cincinnati, Aberdeen, Carrollton, Shelbyville, St. Mathews to Louisville, Ky.

Between Louisville and Miami, we would advise you to go via West Point, Elizabethtown, Cave City, Glasgow, Springfield, Nashville, Murfreesboro, Manchester, Tracy City, Chattanooga, Rossville, Dalton, Cartersville, Atlanta, Griffin, Barnesville, Macon, Perry, Hawkinsville, Waycross, Callahan, Jacksonville, St. Augustine, Hastings, Daytona, Titusville, Melbourne, Ft. Pierce, Palm Beach, Deerfield, Lauderdale, into Miami.

Volumes 4 and 6 of the Automobile Blue Book will give you the complete routing for this trip.

You are likely to encounter snow in the north at this time of the year, but from Cincinnati to Miami you should have fairly good roads providing there is not much rain.

Knox City, Mo.—St. Louis, Mo.

Knox City, Mo.—Editor Motor Age—Kindly give me the best route from Knox City, Mo., via Kansas City, Joplin, Springfield, St. Louis, and back to Knox City.—L. R. Westcott.

In going to Kansas City, we advise that you go through La Plata, Elmer, Bucklin, into Chillicothe, then into Kansas City via Excelsion Springs and Liberty. From Kansas City go south through Harrisonville, Adrian, Butler, Nevada, then from here you have two roads to Joplin. The better connection is via Galesburg. It is a new road which is just being built and is in excellent condition, although much of the travel is going via Lamar, but the Galesburg routing is at least one-half hour quicker.

In going from Joplin to Springfield, go via Webb City and Carthage, or you can go via Monett, Aurora and Republic.

From Springfield to St. Louis, the best routing is to follow the Ozark Trail. In returning from St. Louis up to Knox City, go north through St. Charles, Wentzville, Troy, Auburn, Louisiana, New London, Hannibal, then from Hannibal go up to Palmyra, Taylor, La Grange, then over to La Belle and into Knox City.

Paw Paw, Mich.—Jackson, Miss.

Paw Paw, Mich.—Editor Motor Age—Kindly give the best route from Paw Paw, Mich., to Jackson, Miss.—Irvin Carlson.

In going to Jackson, Miss., we advise that you go via Decatur, Dowagiac, Niles, South Bend, Plymouth, Culver, Logansport, Delphi, LaFayette, Crawfordsville, Rockville, Terre Haute, Sullivan, Vincennes, Princeton, Evansville, then to Paducah, and south to Mayfield, Fulton, Union City, Dyersburg, Brownsville, to Memphis, then continue south via Dundee, Glendora, Lexington, and Canton, to Jackson, Miss.

Volumes 4 and 6 of the Automobile Blue Book will give you complete running directions, also maps, covering this route. These may be procured of the Automobile Blue Book Publishing Co., Mallers Bldg., Chicago.

Oakes, N. D.—Los Angeles, Cal.

Oakes, N. D.—Editor Motor Age—Kindly give the best route from Oakes, N. D., to Los Angeles. Where could I pick up the Lincoln Highway?

What volumes of the Automobile Blue Book cover this route?—H. Bean.

In going to Los Angeles, probably your best routing would be to go south from Oakes to Aberdeen, Redfield, Huron, Iroquois, Carthage, Howard, Salem, Edgewater, Yankton, Pierce, Norfolk, Columbus, then follow the Lincoln Highway to Grand Island, then south to Hastings, and follow the O. L. D. Trail going west through Oxford, Indianola, McCook, Imperial, Lamar, Sterling, Ft. Morgan, Greeley, Denver, Colorado Springs, Pueblo, Walsenburg, Trinidad, Raton, Wagon Mound, Las Vegas, Santa Fe, Albuquerque, Socorro, Magdalena, Springerville, then you have a choice of two routes from Springerville to Los Angeles, one via Phoenix, Yuma, San Diego, and north to Los Angeles, or via the Grand Canyon.

Volume 5 of the Automobile Blue Book will give you the complete routing for this trip.

Des Moines, Ia.—Florida

Des Moines, Ia.—Editor Motor Age—Kindly give me some information regarding a route from Des Moines, Ia., to Florida, either via New Orleans or through Indiana, Kentucky, etc., but would like the best roads.—W. R. Cunningham.

In going from Des Moines to Florida, advise that you go via Newton, Marengo, Iowa City, Wilton, Davenport, then south through Alpha, Galesburg, Farmington, Peoria, Mackinaw, Bloomington, Farmer City, Champaign, Danville, Crawfordsville, Indianapolis, then via Columbus, Seymour, Salem, Louisville, Mammoth Cave, Nashville, Chattanooga, Atlanta, Macon, or you can take a longer route with slightly better roads by going through Richmond, Dayton, Springfield, Columbus, Newark, Zanesville, Wheeling, Uniontown, Cumberland, Hagerstown, then through Winchester, Staunton, Lexington, Roanoke, Winston-Salem, Lexington, Charlotte, Spartansburg, Greenville, Athens, Madison, then into Macon. From Macon go south through Perry, Hawkinsville, Waycross, Callahan, Jacksonville, then down through Florida.

Volumes 5, 4 and 6 will give you complete running directions for this trip.

Little Rock, Ark.—San Francisco, Cal.

Hot Springs, Ark.—Editor Motor Age—Kindly give the best route from Little Rock, Ark., to San Francisco, Cal. Also give us some information regarding the expense for this trip being divided between two people. —R. A. Robinson.

In making this trip we would advise that you go via Hot Springs, Arkadelphia, Texarkana, Anna, McKinney, to Dallas, then via Arlington to Ft. Worth, then via Caddo and Albany, into Abilene, then via Sweet Water, Brownfield, Roswell, and Alamogordo, into El Paso, then via Douglas, Tucson, Mesa, Phoenix, Palomas, Yuma, El Centro, San Diego, then north to Los Angeles and San Francisco, via Santa Clara, Santa Barbara, Paso Robles, Salinas, San Jose, then into San Francisco.

If you average 150 miles a day you should make this trip in about 16 or 18 days, provided you have good weather and no trouble.

Volumes 5 and 8 of the Automobile Blue Book will give you complete running directions for this trip.

Motor Age can give you no information regarding dividing the expenses on this trip.

Chicago, Ill—Miami, Flo.

Ashton, Ill.—Editor Motor Age—Is the Dixie Highway the best route between Chicago and Miami, Fla.?

Is this highway marked all the way?

What is the present condition of the roads, and what Blue Books will be required for this trip?—F. A. Richardson.

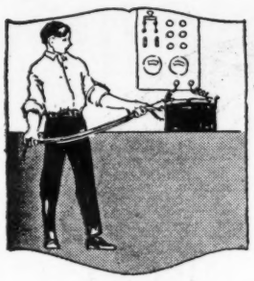
The Dixie Highway is not the best route between Chicago and Indianapolis. A better way is to go via Hammond, Dyer, Crown Point, Thayer, Rensselaer, Wolcott, Lafayette, Frankfort, Lebanon, Indianapolis. Then from Indianapolis, go via Franklin, Columbus, Seymour, Vallonia, Salem, to Louisville.

From Louisville, the best routing would be via Cave City, Springfield, Nashville, Chattanooga, then the east road from Chattanooga to Atlanta, then south to Macon, and via Hawkinsville, Nicholis, to Waycross, and via Folkston, and Callahan to Jacksonville, and follow the coast down to Miami.

The Dixie Highway is marked in several sections, but not all the way. The present condition of the roads is only fair, especially in going through Kentucky and Tennessee, but through Indiana you will have very good roads, and also in northern Florida. If you have good weather, however, you should have no difficulty in making this trip.

You will need Volumes 4 and 6 of the Automobile Blue Book, which may be procured of the Automobile Blue Book Publishing Co., Mallers Bldg., Chicago.

In going from Ashton you will find it better to come into Chicago, or else as far as Geneva and down through Aurora and Joliet and then to Dyer, if you do not wish to come into Chicago.



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.

Editor's Note — Herewith is presented the sixteenth installment of a weekly series of articles which began in Motor Age issue of June 29, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., Chicago, in a size to fit the pocket conveniently.

WHAT HAS GONE BEFORE

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems and the relations of current pressure and resistance brought out. This was followed by an explanation of series and multiple circuits, and how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells were taken up and the best methods of connecting them. A separate section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and best methods of charging them. Magnets and electro-magnetism then were considered and the principles of generators and motors explained.

Part XVI—Fields and Field Windings for Generators and Motors

IN the previous consideration of the production of an electrical pressure, in a conductor when it is moved across a magnetic field, as in the case of the armature of a generator, the presence of the field has been assumed and nothing has been said as to the method of providing the magnetic field. The term "field" is applied interchangeably to the magnetic lines of force between the pole faces of the field magnets and to the field magnets themselves. There are two methods of producing the magnetic field for generators and motors, and these methods will be discussed in the following paragraphs:

The permanent magnet provides perhaps the simplest method of producing a magnetic field. The field produced by a permanent magnet is quite weak as compared to one produced by an electric current, and the magnetic field of the permanent magnet cannot readily be changed to meet changing requirements. The use of the permanent magnet as a means of producing a magnetic field is confined in motor cars almost entirely to the ignition magneto at the present time.

If an electric current be passed through a winding surrounding a piece of iron, the piece of iron will become magnetized by the action of the current. The degree to which the piece of iron becomes magnetized will depend upon the number of turns of wire in the winding and the current in the winding. The polarity of the pieces of iron will depend upon the direction in which the current passes around it, as previously explained. The magnetic circuit of the generator and the motor is the path in which the magnetic lines of force exist and may assume many different forms, depending upon individual requirements.

Types of Magnetic Fields

The simplest form of magnetic field is one in which the armature rotates between two magnetic poles, and it is known as a bipolar field. Three different forms of bipolar magnetic fields are shown in Figs. 114, 115 and 116. In Fig. 114 the winding in which the current producing the magnetic field flows is placed around the part of the magnetic circuit marked C in the figure. This winding is always spoken of as a field winding. The magnetic lines produced by the current in this winding circulate in the magnetic circuit indicated by the arrows, and they are all produced by a single coil of wire. This coil of wire is usually spoken of as a field coil.

A bipolar magnetic field is shown in Fig. 115. There are two field coils, one about C and another about C1. Both of these field coils tend to produce a magnetic field through the armature in the same direction. There are two paths for magnetic lines around the outside.

A third type of bipolar magnetic field is shown in Fig. 116. In this case there is only one field coil, and it is placed around the part marked C. There are two paths for the magnetic lines around the outside, similar to the circuits shown in Fig. 115.

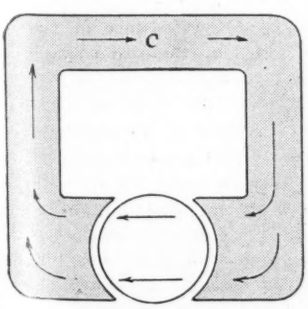


Fig. 114—Magnetic circuit of simplest bipolar machine with one field coil at C

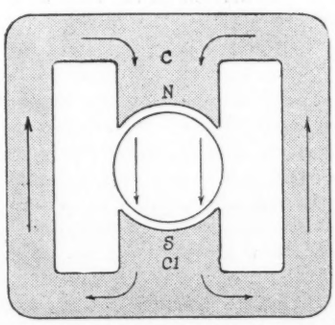


Fig. 115—Bipolar magnetic circuit with two field coils, one at C and one at C1

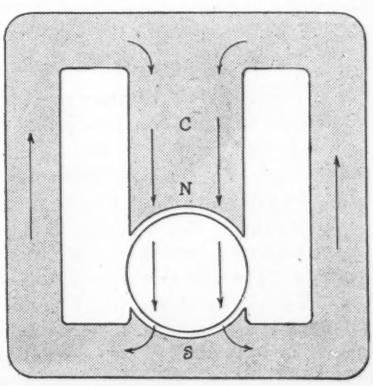


Fig. 116—A bipolar field with one coil

A multipolar magnetic circuit of four poles is shown in Fig. 117. In this case there are four field coils and they are wound around the four parts marked C. It will be seen that two of these field coils act on any one of the four magnetic circuits. Alternate poles around the armature are of the same polarity, and adjacent poles are of opposite polarity.

A four-pole magnetic circuit is shown in Fig. 118, but only two field coils are used instead of four, as in Fig. 117. These two field coils are placed about the parts of the magnetic circuit marked C in the figure. The general appearance of the magnetic circuit, as shown in Fig. 118, is quite similar to the one shown in Fig. 115, which is bipolar. A close comparison of the two will make the difference very noticeable. In Fig. 115 field coils about C and C1 both act to produce a magnetic field through the armature in the same direction, while in Fig. 118 the two field coils act to produce the magnetic field through the armature in opposite directions. As a result of the two field coils acting to produce a magnetic field across the armature in opposite directions and on account of the nearness of the iron to the two sides of the armature, the magnetic lines pass through the paths indicated by the arrows. In this case only one field coil acts on any one of the four magnetic circuits.

When the magnetic circuit is arranged similarly to Figs. 115, 116, 117, 118 and so forth so that the field winding is practically surrounded by the iron, forming part of the magnetic circuit, it is called an iron-clad type. This type of construction is a better protection for the field coils, and for this reason, all other things being equal, is much preferred to an open or exposed type of construction, as shown in Fig. 114.

Parts of the Magnetic Circuit

The magnetic circuit of almost every dynamo is composed of five parts, and they are:

First, the armature core, which usually consists of a cylinder of laminated iron, mounted on a shaft and having its surface grooved to accommodate the armature winding. In the ring type of armature the core is in the form of a ring. The reason for laminating the armature core is to produce the loss due to currents in the iron core itself which are called *eddy currents* and which tend to heat the armature and decrease the efficiency of the machine. The armature core serves the double purpose of conducting the magnetic lines from pole to pole and at the same time supporting the armature winding.

Second, the air gap, which is the clearance between the armature core and the end of the poles.

Third, the pole shoes, or pole pieces, which are the ends of the poles adjacent to the air gap. They are in some cases given a special shape in order to improve the distribution and arrangement of the magnetic lines forming the magnetic field. In some cases the pole shoes are made separate from the field core and bolted to the cores.

Fourth, the field cores which are the parts of the magnetic circuit about which the field windings are placed.

Fifth, the yoke, which is the outside portion of the magnetic circuit connecting the field cores. The yoke forms part of the magnetic circuit and at the same time serves as a mechanical support for the field cores and pole shoes, holding the pole shoes in their proper position with respect to the armature.

Series Generator

A series generator is one in which the armature and field windings are connected in series, and any current supplied by the armature passes through the field winding. The connections of a series generator are shown in Figure 119. The operation of such a machine, in brief, is as follows: Assuming that there is some residual magnetism in the fields due to their having previously been magnetized there will be a low electrical pressure induced in the armature winding when the armature is revolved in this weak magnetic field. This induced electrical pressure will not produce a current unless the terminals of the machine be connected directly together or by means of an external circuit. The current due to this low induced electrical pressure will flow through the field winding and increase the strength of the magnetic field, which in turn will increase the induced electrical pressure, which will increase the current, etc. This operation would continue indefinitely and the induced pressure and current would both become dangerously high unless some means were provided for controlling them. As the current in the field winding increases, the number of magnetic lines in the field increases, but after a certain field strength has been reached, the magnetic lines cease to increase, due to a given increase in current, as rapidly as they did at first, and finally there is a very little increase in these lines, due to an increase in the field current, and the iron forming the magnetic circuit is said to be *saturated*. The series field winding is composed of a relatively small number of turns of wire of ample size to safely carry the maximum current the machine is designed to deliver.

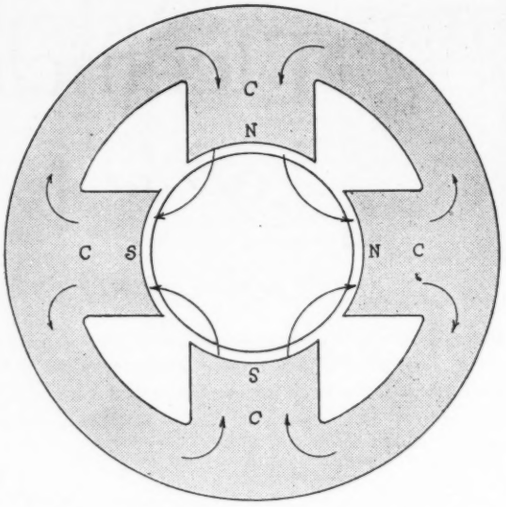


Fig. 117—A four-pole magnetic circuit with four field coils

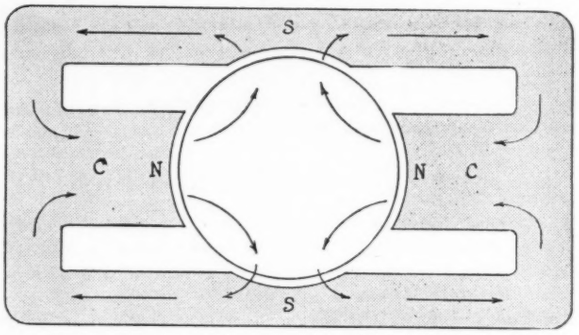


Fig. 118—A four-pole magnetic circuit with two field coils

Shunt Generator

A shunt generator is one in which the field winding is connected directly to the terminals of the armature as shown in Fig. 120. The current in the field winding at any time is equal to the pressure between the brushes divided by the resistance of the winding and is independent of the current the generator may be supplying to a circuit connected to its terminals, unless the current supplied changes the pressure between the brushes. The shunt generator will have a low pressure induced in its armature, due to the residual magnetism in the fields. This pressure produces a current in the field winding, which in turn increases the strength of the magnetic field. This in turn increases the induced pressure, which increases the field current, etc. This operation continues until the magnetic condition of the iron is such that both the electrical pressure and field current become steady. In the series generator, the terminals of the machine had to be connected together in some way in order that the electrical pressure induced in the armature increase, while in the shunt generator it is not necessary to have the terminals connected in order that the elec-

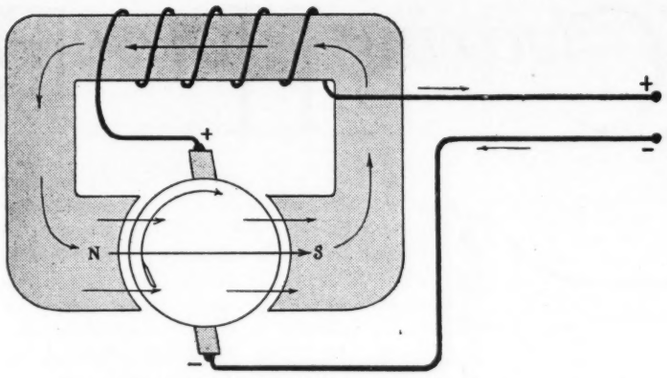


Fig. 119—A series field winding; the field winding is in the same circuit as the armature and outside circuit

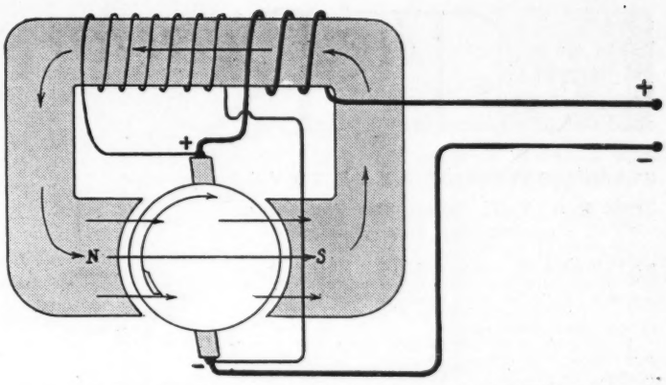


Fig. 121—A cumulative compound field, in which shunt and series windings are in the same direction

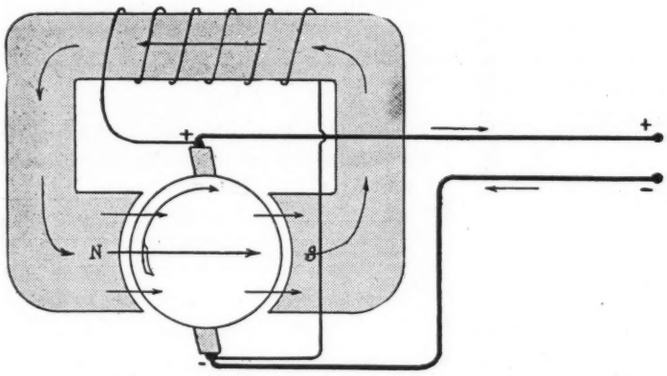


Fig. 120—A shunt field; the field winding is in parallel with the outside circuit

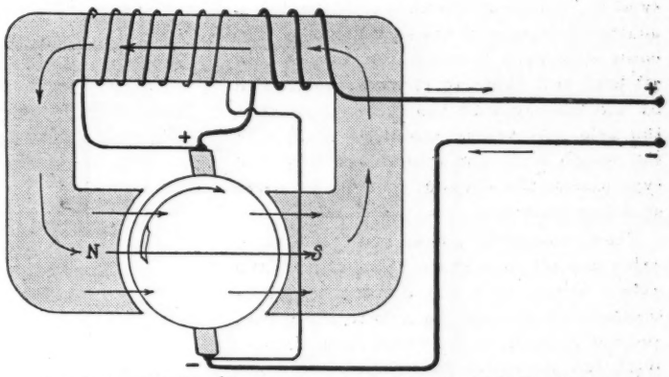


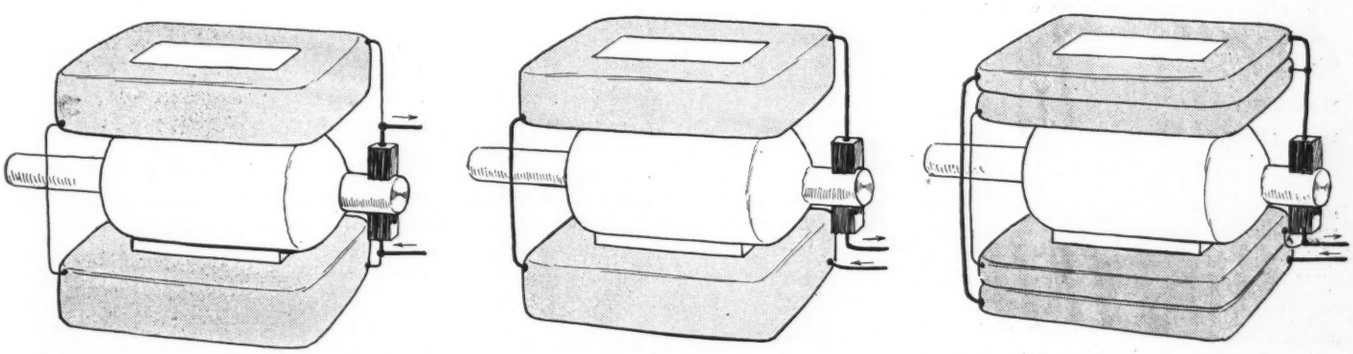
Fig. 122—A differential compound winding in which the shunt and series field coils are wound in opposite directions, and thus buck each other

trical pressure induced in the armature increase. In fact, it is best to have the terminals entirely disconnected from all circuits.

The shunt field winding is composed of a relatively large number of turns of small wire. The current the shunt field winding carries is usually a small part of the total current the machine is capable of generating.

Compound Generator

A *compound* generator is a combination of a series and a shunt generator. When the magnetizing action of the series and shunt field are in the same direction as shown in Fig. 121, it is called a *cumulative compound* generator. If the magnetizing action of the series and shunt fields are in opposite directions, as shown in Fig. 122, it is called a *differential compound* generator. When the shunt winding is connected directly to the brushes, the machine is called a *short shunt* compound machine, as shown in both Figs. 121 and 122. If the shunt winding is connected across both the armature and series field, the machine is called a *long shunt* compound machine. The action of these field windings will be discussed at length under the subject of generator output. It is by these field windings in some lighting generators that the current to the battery and lights is kept constant.



THE THREE MAIN TYPES OF GENERATOR FIELD WINDING

At the left is shown the shunt method of winding, in which the armature and field windings are in parallel. At the center is shown the series winding, in which armature and fields are in series. At the right is shown the compound winding, in which there are two separate fields, one in series with the armature and the other in parallel with the armature.

NEXT WEEK

Regulation of the Generator's Output will be the subject of the next installment of this series.

The Readers' Clearing House

CLASSIFICATION OF AXLE TYPES

Fixed-Hub, Full-, Semi- and Three-Quarter-Floating Described

MILWAUKEE, Wis.—Editor Motor Age—What are full-floating, semi-floating, and non-floating axles, and how are they made?

2—Explain the design and working principles of a planetary gearset.

3—Let me know something about the American School of Correspondence. Is it a good school, and are they reliable for what they do?—Harry Elmore.

1—Rear axles may be classified as either fixed-hub or full-floating. The fixed-hub type is further subdivided into the three-quarter-floating and the semi-floating. The main difference between the two is that all load and skidding stresses are carried by the housing with the full-floating axle, the axle only taking the stress of driving the wheel, while the axle of the fixed hub type carries the stress of driving, load and skidding combined.

The three-quarter-, semi- and full-floating axles are all live axles. The term "live axle" means that the driving torque is transmitted through the axle to the wheel, and not directly to the wheel from a chain. With few exceptions, commercial cars are the only ones that do not have live axles today.

Fig. 1 shows a typical semi-floating axle construction, such as used in the Ford. It differs from the three-quarter-floating type, Fig. 2, mainly in the location of the wheel bearing. It will be noted that the bearings of the three-quarter axle are directly in line with the wheel spokes. This tends to remove the leverage of the direct load stresses on the bearing housing.

With the same care in design and in selection of material, any one of the three types will give satisfaction and are in common use.

2—This will appear in next week's issue.

3—An old school and undoubtedly a good one.

MAGNETO VS. ORDINARY CURRENT

Why 110-Volt Lighting Supply Will Not Jump Plug Gaps

Radley, Kan.—Editor Motor Age—I would like to know what difference there is in the electric produce by a magneto on an ordinary motor car, and that of direct or alternating light current. Why is it that lighting current will not jump the gap in the spark plug and run a gasoline motor and that of a magneto or storage battery will jump?

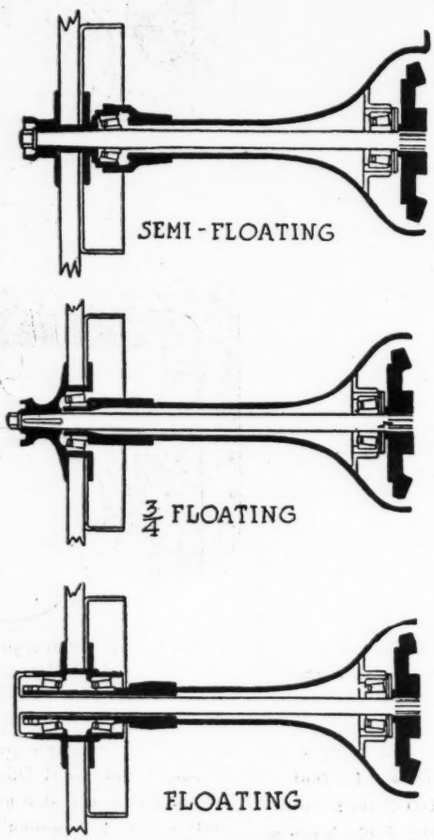
2—Also please state the name of the two different currents.

3—I would also like to know if the electricity run in storage battery makes any changes when it comes out, that is, when it is used from the storage battery. What is the cause of the change and name?—John Silvia.

1—The difference is in the amount of voltage. In a magneto, high-tension current is produced, that is current of a high voltage. In alternating or direct lighting current the voltage is comparatively low. The higher the voltage the greater the gap that the current will jump. Lighting current has not enough voltage to jump the gap.

2—High tension and low tension.

3—The storage battery is an instrument which takes in electrical energy, converts it into chemical energy and then disperses it as electrical energy when it is demanded. If 6 volts is going in as a charge and 6 volts is going out for lighting and starting, the quality of the current is the same. Of course, it will accept a charge as great as the generator regulator will allow and will turn out a charge from zero to its maximum capacity. If you wish to become more thoroughly acquainted with the theories of electricity, we suggest that you follow the series in Motor Age entitled, "Electrical Equipment of the Motor Car."



Figs. 1, 2 and 3 represent three types of rear axles which are described on these pages

THREE TYPES OF AXLES DESCRIBED

Meaning Not Clear Regarding Limitations by S. A. E.

Columbus, O.—Editor Motor Age—Kindly publish sketches and explanation as to just what constitutes a semi, a floating, and a three-quarter floating axle, also what limitations each has according to the S. A. E.—Dr. G. M. Hiner.

The three types of axles are illustrated in Figs. 1, 2 and 3. The difference is in the method of suspension of the car weight by the location of the bearings. In the floating type the driving axle is a floating member which is called upon only to transmit power and not to take any of the car weight. In the three-quarter floating type the axle shaft is depended on to drive the wheels as well as take part of the load caused by thrust reaction when the wheel skids sideways. It differs from the semi-floating in that the outer bearing is within the wheel while in the former the outer bearing works within the axle housing. We do not know what you mean by limitations according to the S. A. E. This society does not pass judgment on various constructions. See answer to inquiry of Harry Elmore, Milwaukee, on this page.

MAXIMUM R. P. M. OF FRANKLINS

No Official Record of the Speed of These Models

San Francisco, Cal.—Editor Motor Age—What is the r. p. m. of the Franklin car of 1915 and 1917? Also, what is the speed of each model?

2—What is the speed of the new sixteen-valve Stutz?

3—Is the Rader who drove the Packard a record lap on the Indianapolis track the Rader who drove relief for the Stutz one year on the same track?

4—What make of motor is used in the Premier racing cars?

5—Publish a short description of the new 300-inch Mercer racing cars.—Subscriber.

1—On the series 4, 5, 6, 7 and 8 the maximum revolutions per minute is 1,500 and on the series 9, 1,850. The same motors were used in the series 4, 5, 6, 7 and 8. The series 9, which is the latest model, has a motor which is different in a great many ways. There is no official record of the speed.

2—There is no official record of the speed. The writer has driven one of these cars over 50 miles per hour and there was still a great deal of advance left in the throttle.

3—Yes.

4—It is a special racing motor made in the Premier factories.

5—Motor Age has not yet received a description of the new Mercer racing cars.

PUTTING FORD MOTOR IN BOAT

Propeller Should Not Turn Over 1,000 Revolutions Per Minute

Plattsburg, Mo.—Editor Motor Age—Please tell me how many revolutions the Ford engine will make per minute running on high gear, making 20 miles per hour; at 30 miles per hour? My reason for wishing to know is, I have a motor boat and am figuring on putting a Ford engine in it. The propeller shaft will run direct to the propeller from the engine.—Jack Haynes.

With 30-inch wheels and the stock gearing of 3.63 to 1, the Ford motor is revolving approximately 813 revolutions per minute at 20 miles per hour and 1,220 revolutions per minute at 30 miles per hour. You should not expect to turn over a propeller faster than 1,000 revolutions per minute, and 800 would be a still better figure. At this speed the Ford motor does

not come near developing its maximum power and so do not be disappointed if your boat does not have the get-up-and-get to it that the Ford car would.

VALVES ARE SET EARLY AND LATE

Differences Described and Illustrated — Factory Setting Best

Carmi, Ill.—Editor Motor Age—Where can I obtain a pair of driving goggles such as is used largely by race drivers, that is, with an adjustable connection, I think by a spring, between the two lenses?

2—Explain, if possible by diagram, what is meant by setting valves early or late, giving comparisons of the two.

3—Which is better for high speed?

4—Can the following timing be altered any to obtain higher speed, and if so, how? Intake opens 3 degrees after center, closes 32 degrees after center; exhaust opens 47 degrees before center, closes 2 degrees after center.—Subscriber.

1—Any well-equipped motor car supply house should be able to supply you with goggles that would answer your purpose.

2—Fig. 4 shows a motor in which the pistons are located in two positions. In the position where the piston is shown nearest the top, the valves are opening early. You will note that the intake valve is just beginning to open by the action of the cam. This is an early setting. In the position where the piston is below, a late setting is the case. This is greatly exaggerated to make the matter clear. The intake valve is opening at the same time in both positions of the piston.

3—Correct timing, that is the timing the builders have designed the motor for is best for high speed.

4—Are you sure this is the timing? It is very early. In ordinary practice the intake valve starts to open in the neighborhood of 12 degrees below top dead center. We do not know what kind of a car you have, but it is our opinion that the valves are set way too early.

TIRE SIZES FOR WEIGHT OF CAR

34 by 4 Size Large Enough for 2,500-Pound Roadster

Amory, Miss.—Editor Motor Age—On a 2,500-pound roadster are 34 by 4 tires large enough?

2—Are 35 by 4 better size as to carrying capacity, or worse than 34 by 4?

3—Who makes inexpensive wire wheels to fit Timken axles?

4—Isn't there some firm in Detroit or Chicago who advertised for inventions pertaining to motor cars? I have two accessories and want some interested parties.

5—Please state the correct valve timing of model M Thomas 6, also a good speed setting. What will this car do?—R. F.

1—Yes.

2—The larger tires will carry more weight.

3—See list of wire wheel makers in clearing house department of last week's issue of Motor Age.

4—If you care to do so you may send us sketches or photographs and descriptions of your inventions and if they are of merit they will be described in the Accessory Corner of Motor Age. If you have not applied for patents and consider the inventions worth while, we would strongly advise that you put through patent applications before bringing them before the public, or any sales agency.

5—The correct timing is conventional, that is about 12 degrees below top dead center for the inlet valve to start opening. This is a good speed setting. We have no record of the speed of this car.

REGARDING CAR SPEEDS

The readers' clearing house department receives a great number of communications in which the maximum speed of a certain car is asked for. In an effort to satisfy our readers with some information other than, "we do not know," we have given them approximate figures which we have obtained from the factories or from dealers. In a good many instances this has proven unsatisfactory; the owners have complained that they could not get the speed we told them they should, and in a few instances the factories have requested that we give no figures of speed.

Hereafter Motor Age will only give maximum miles per hour figures when the particular stock car has made a speed test under the observation of the American Automobile Association. The reason for taking this stand is that two cars of exactly the same model may have a difference of 5 miles per hour in speed, that maximum speed depends on the condition of the car, the inflation of the tires, the atmosphere, the roads encountered, etc., etc., and that opinions may be inflated. Records are the only sure test.

It is not fair to tell a man who drives a car in the mountains of Colorado that his car should make a speed which some dealer claims to have made with the same model on a macadam road in Indiana. If we give you a maximum from an official test you will know that this is about the highest possible speed that particular model will make with all conditions ideal. It is very likely that your car will not go that fast.

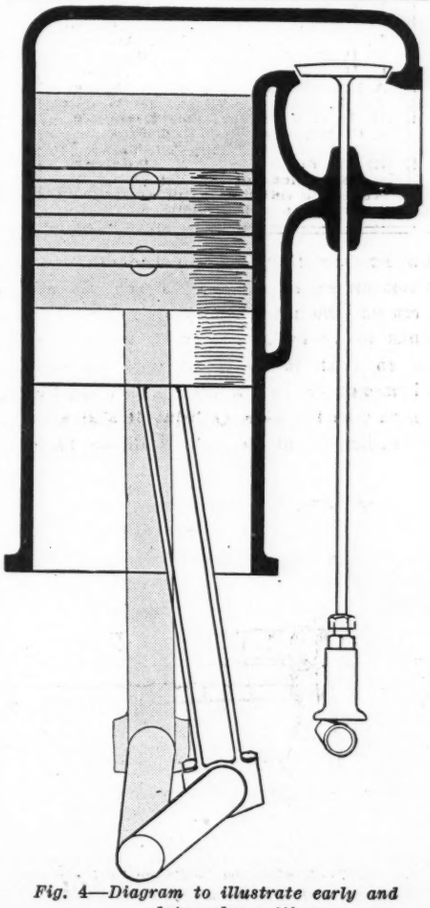


Fig. 4—Diagram to illustrate early and late valve setting

WANTS TO REVERSE BRUSH DRIVE

It Is Not Advisable to Install a Larger Motor in This Chassis

Chandler, Ind.—Editor Motor Age—What is the horsepower of the Brush one-cylinder engine? This engine turns in the reverse direction of most motor car engines. Would it be possible to reverse the differential, or differential and jackshaft together and run this car with a light four-cylinder engine like the Yankee? Would it be advisable in changing engines to change to the planetary transmission, or is the transmission of these cars when in proper shape sufficiently strong for a high power engine, having also lengthened frame two feet and put on light truck bed?—F. P. Steinmetz.

The N. A. C. C. horsepower is 6.4. There is no way that the planetary gearset can be changed so as to get it to run in the opposite direction. However, if you wish to install a motor which turns in the opposite direction, the only way it could be used would be to turn the differential and jackshaft assembly end for end, which would then place the oil plug in the differential housing, which is in the present construction on top, underneath. In doing this it would change the drive gearing in the differential to the opposite side of the bevel pinion; a makeshift alteration at the best and it is not advised. We do not think the Brush chassis would stand a larger motor. The cost of all of the alterations you suggest would buy you a very good new car.

MYSTERIOUS BATTERY TROUBLE

Possibly the Terminals are Corroded so that Current Is Checked

Casco, Wis.—Editor Motor Age—I have a seven-passenger Buick model D-55, 1916, on which starter sometimes refuses to work when I pull in button and push starting pedal, there is no buzzing sound which it otherwise makes when properly working. I can shove starting pedal back and forth, but seems to have no effect, neither will the lights burn on these occasions. This, however, rights itself in a few minutes and starter will start engine and everything works properly. What is the cause?

2—Please show wiring of Delco system as installed on Buick D-55, 1916.—G. H. Moede.

1—The writer experienced the same trouble as this, although the make of car and electrical system was different. After a long search he found the trouble to be in one of the battery terminals. This had become heavily corroded and the current did not seem to pass through until it had been turned on for some time. Then, as in your case, everything worked properly. It is suggested that you scrape the terminals with a knife blade, until they are smooth and shiny, then put them back in and tighten them.

2—The wiring diagram will be published in next week's Motor Age.

Plans For Big Garage

Ludington, La.—Editor Motor Age—Advise where we can secure plans for an up-to-date public service garage and salesroom combined. We have in mind a building to be about 100 feet wide by 140 feet long.—R. F. Morse.

Motor Age will gladly prepare a plan for you if you will advise how many stories you contemplate building and advise how many cars you would expect to sell in a year. On the amount of cars you sell de-

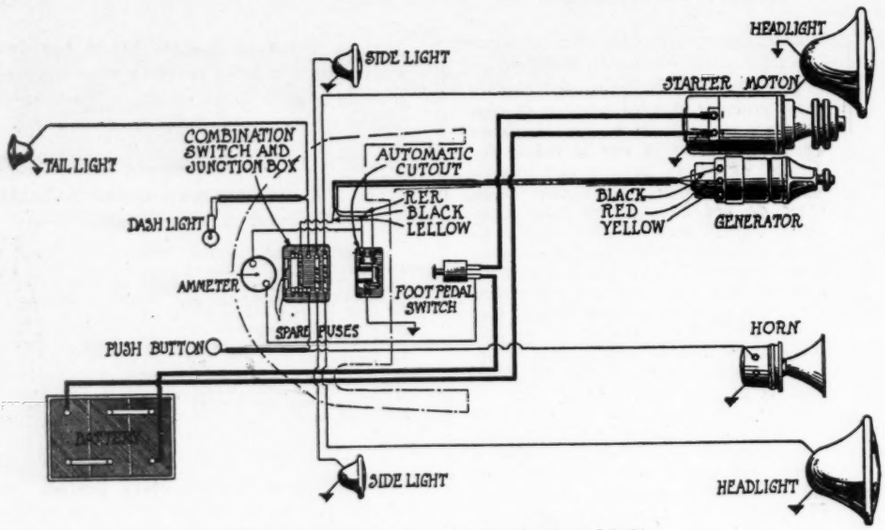


Fig. 5—Wiring diagram of Overland model 79

pends the amount of service which it is necessary to render and this should be considered in planning a garage.

HOW THE ENGER TWELVE WORKS

Exhaust Valves Are Lifted and Intake Manifold Closed

Dallas, Tex.—Editor Motor Age—What is the bore and stroke of the 1914 Cadillac, also the gear ratio and speed in high?

2—What is the gear ratio of a 1914 Lozier 4 in third and fourth speeds, respectively?

3—Illustrate by diagram and explain the principle of the Enger Twin-unit Twelve, that is, the changing from a six to a twelve, and a twelve to a six?—A Reader.

1—The bore is 4½ inches and the stroke 5¾. In this car the two-speed, direct-drive rear axle was used. In this construction there are two bevel pinions and two bevel gears thereby having two different gear ratios, each driving direct from the engine to the axle without intermediate gearing. To change from one gear ratio to the other was accomplished by means of an electrical switch and the clutch pedal. The low direct-drive gear ratio is 3.66 to 1 and the high, 2.5 to 1. The speed of this car, when in good condition and proper adjustment, ranges from 50 to 55 miles per hour.

2 — The gear ratio in third speed is 3 13/14 to 1 and in fourth 2.85 to 1.

3—The diagram in Fig. 7 shows the operation of cutting off six of the cylinders in the new Enger. The exhaust valves are lifted by a separate set of cams so that the regular cams do not lift them or allow them to drop. Another lever closes a butterfly valve in the intake manifold so that no gas is permitted to enter the cylinders. In this way the firing of one block of cylinders is effectively cut off.

OPERATION OF OVERLAND CUT-OUT

Illustration and Explanation of Working Principles of the Device

Lake City, Ia.—Editor Motor Age—Explain how to fit new pistons to new cylinders.

2—Why does carbon form on intake valves more than on exhaust valves?

3—Explain the working details of a cutout with electrical system of an Overland M-79.

4—Publish the complete wiring diagram of an Overland M-79.—John L. Lee.

1—We figure it this way, and we might as well be frank about it. If you do not know how to fit pistons to cylinders you are not an expert, and if you are not an expert you should not attempt to fit new pistons to cylinders. It is a job for the shop that is equipped with micrometer instruments, and it should be done by the man who knows exactly what clearance, in thousandths of an inch, it should be done. A misfit job simply has to be done over again. There is no way out of it. The amount of power your motor will develop depends a great deal on the fit of the pistons.

2—This may be the case in a particular motor. It is not thought to be general.

3—The cut-out consists of an electromagnet with two windings. One is a shunt winding of many turns of fine wire. The other is a series winding of a few turns of heavy wire, both windings being over a soft iron core. The shunt winding is permanently connected across the positive and negative terminals of the dynamo, so that when the dynamo comes up to charging speed, this winding energizes the magnetic core, which attracts the armature and closes the contact points, see Fig. 6, thus completing the circuit between the dynamo and battery. So long as the cut-out points are closed, the current must pass through the series winding of the cut-out. This current adds its magnetizing influence to that of the shunt winding and holds the cut-out points together. If, now, the speed of the dynamo drops below charging speed, the current begins to flow from the battery through the cut-out series winding, in the reverse direction. This weakens the electrical pull and allows the spring to open the cut-out points. This differential action of the cut-out enables the contact points to work positively, even when there is a considerable vibration.

4—This is published in Fig. 5.

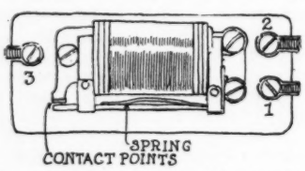


Fig. 6—Sketch of cutout in Overland model 79

Communications Received and Inquiries Answered

Harry Elmore.....Milwaukee, Wis.
Dr. G. M. Hiner.....Columbus, O.
John Silvia.....Radley, Kan.
Subscriber.....San Francisco, Cal.
Jack Haynes.....Plattsburg, Mo.
R. F. Morse.....Ludington, La.
Subscriber.....Carmi, Ill.
R. F.....Amory, Miss.
F. P. Steinmetz.....Chandler, Ind.
G. H. Moede.....Casco, Wis.
A Reader.....Dallas, Tex.
Jon L. Lee.....Lake City, Ia.
H. D. G.....New Braunfels, Tex.
I. C. Mitchell.....Greensburg, Ind.
J. T. Lowe.....Mt. Vernon, S. D.
Brooks Corson.....Portland, Ark.

No communication not signed by the inquirer's full name and address will be answered in this department.

Battery Will Not Hold Up

Greensburg, Ind.—Editor Motor Age—How can one test a generator to tell if it is charging the battery? I have a new Exide storage battery on my 1914 model B Marion that will only stay charged about 2 weeks. I cannot figure out if it is grounded somewhere or trouble in the generator. Have had the battery charged five times in the last 3 months.—I. C. Mitchell.

An ammeter is the sure method of telling whether the generator is charging the battery. Refer to the article beginning on page 5 in last week's issue of Motor Age. This should assist you in locating the trouble.

Determining Battery Poles

Portland, Ark.—Editor Motor Age—If one were to receive a storage battery to be recharged and it had no charge in it whatever, and had sulphated so badly that it was impossible to tell the positive from the negative how would one determine the different poles?—Brooks Corson.

You can determine the positive plate by scraping through the crust and finding the red oxide. There is no reason why the battery cannot be charged in the regular way, carefully watching the temperature, and running a slow charge. Negative is gray.

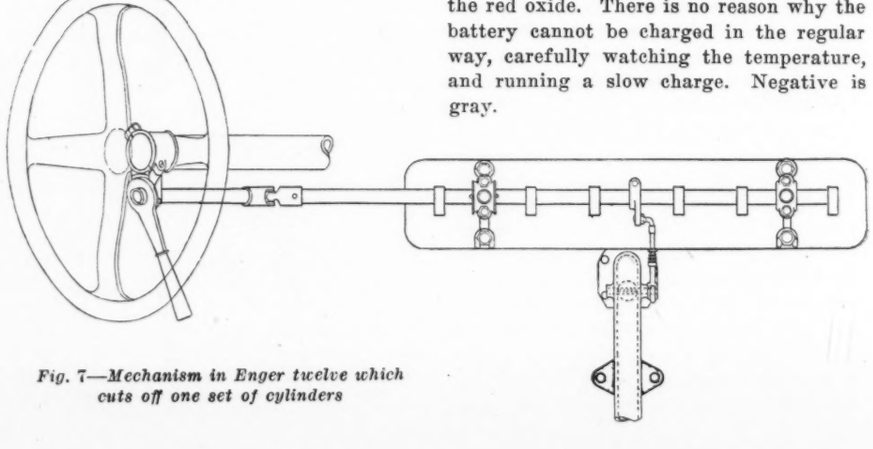
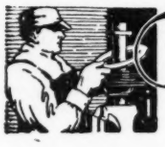


Fig. 7—Mechanism in Enger twelve which cuts off one set of cylinders



The Motor Car Repair Shop

Soldering Electrical Connections

FEW mechanics or repairmen realize the close relation between properly soldered joints and splices and the permanency of a repair. If one piece of wire is fastened to another or to a terminal and wrapped with adhesive tape without a soldering job being done, the connection will be of sufficiently low resistance at the time and will give satisfactory results until corrosion of the parts takes place and build up a resistance to the circuit, which can become damaging.

When corrosion on terminals of connections causes an electrical system to go bad, there is no trouble more difficult for the repairman to locate. All connections should be soldered immediately after they are made. In soldering wires to terminals, it is a worthy precaution to see that solder does not flow over any part of the wire away from the terminal. The wire will be made brittle by the heat. When making any soldered connection, the tinned side of the soldering iron should be held close to the point where the soldered union is to made. Do not move the iron over the surface. Hold it still on the one point so that the solder will flow freely. After completing the job always test it with a battery to see that a good connection has been made, before inserting it in the car.

Kind of Flux

Equally important is the kind of flux used in the soldering. There is a soldering acid which is mostly muriatic; soldering salts, soldering paste, resin, and resin dissolved in grain alcohol, among the most commonly used fluxes.

To make a muriatic soldering acid, pure zinc should be dissolved in the muriatic until it has saturated the solution, in other words until no more zinc will dissolve. This solution is very good for soldering tin sheets, iron sheets, or for most any kind of large work, but should never be used for terminal connections around wire which has an insulating covering. The acid is sure to get into the insulation and ruin it. If the muriatic solution is used the soldered parts should be washed off, when the job is completed, with a strong solution of soda and water. This will remove the remaining acid. Bear in mind that muriatic acid is a conductor of electricity and, if left on the metal parts, is liable to cause grounds or short circuits which are hard to locate. The same trouble can be caused by many of the prepared soldering salts and pastes.

Powdered resin should be dissolved in grain alcohol until the mixture becomes the consistency of a thin syrup. The alcohol will, of course, evaporate and, if the solution is kept any length of time, more alcohol will have to be added to keep the liquid of the proper consistency. An airtight container is the best to use for keeping this solution.

Something might be said of the soldering iron itself. Its size and shape depend on the kind of work to be done. When doing small work on terminals, etc., a ½-pound iron with a fairly sharp point will give the best results. In large work a medium sharp-pointed iron of 1 or 2 pounds weight is the best to use. The extreme point of the iron should be blunt.

Much current is consumed when an electric soldering iron is used for any length of time. This can be reduced by applying a simple attachment. A 32-candlepower lamp may be connected in series with the iron. Then connect a switch so that, when it is closed, it will short circuit the lamp and let the required amount of current flow into the iron. When not soldering open the switch. This will form a resistance through the lamp and reduce the amount of current passing into the iron, but still not permitting it to cool. There will be a current saving, the iron will wear better, the point will remain tinned longer and the iron kept warm enough so that only a few seconds of direct current into it will bring it to the desired heat.

When putting a coating of tin on an iron, the point should be thoroughly cleaned and hammered to shape first. This will stick the tinning to the point. The iron should be dipped in a salammoniac solution when tinning.

Removing Tar Stains from Body

With the advent of tar-covered country roads, many motorists are encountering difficulty in removing the spots of tar which fly onto the car body. The tar may be easily removed by applying the following antidote:

First, if the car is dusty, hose it down wherever the tar is sticking, preferably with luke-warm water. Dry off with a chamois by dabbing, making no attempt to pass the leather back and forth across the body surface. Having done this take a piece of soft material, such as the best woolen waste or linen, and soak it with vaseline or unsalted butter. Rub the tar splashes until they disappear. It will be found necessary to change the rag frequently, and do not hesitate to use plenty of grease.

Then wipe off all superfluous grease, and wash the car down with lukewarm water and a good body soap. On no account should you leave the car standing with the spots on longer than absolutely necessary. They should be removed immediately upon your return home. If allowed to set the tar will permanently mark the varnish.

When a car has been run in a heavy rain, particular attention should be given to the finish of the hood, as after a long run the hood becomes fairly hot, and if the rain drops are left to dry upon it they will stain far more than they would upon the body or fenders. If circumstances do not permit washing the car at once, the precaution should be taken of sponging the hood and rubbing it with a chamois until it is dry. Otherwise the spots are liable to become permanent.

After a summer of being tucked away in the rear seat of your car or up under the top, the side-curtain windows have become more or less discolored and spotted with dust and grease. The micas can be cleaned by rubbing them carefully with a cloth soaked in vinegar and then washing them off with clean, cold water. Do not let the vinegar soak into the fabric of the curtain.

To Determine Tire Pressure

The motorist should determine the load for each tire on his car and regulate his air pressure to carry that load without injury to the tire. This is a rule which has been laid down to motorists over and over again, but still is disregarded to the extent that, and it is a conservative estimate, there are 75 per cent of all tires used relegated to the scrap pile before their term of life should have become expended. The weight of load on each tire can be determined by weighing a car with the back wheels on a scale and the front wheels off and dividing the result by two.

To determine the air pressure the following is about the correct proportion, the result being the pressure required:

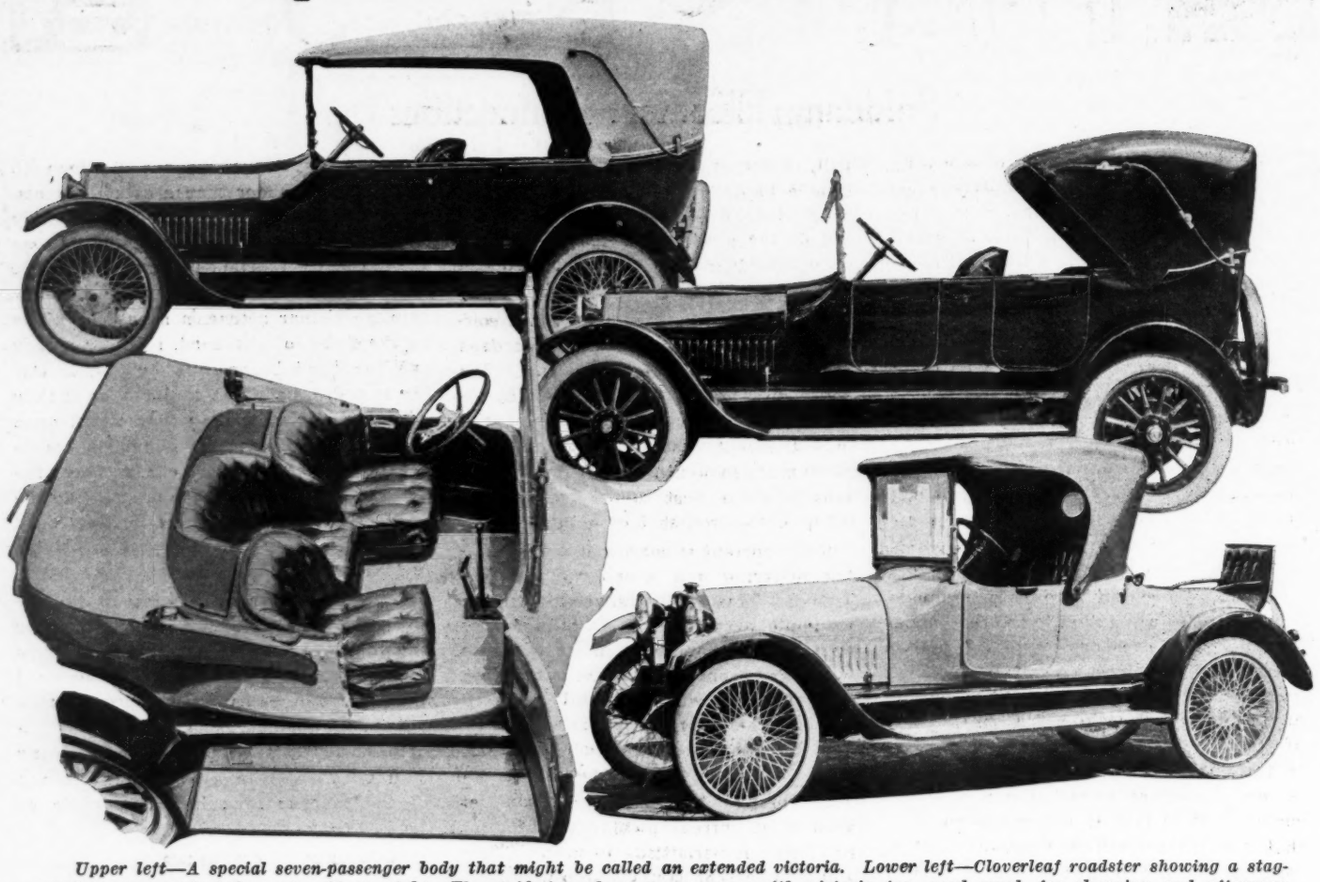
3-inch .....divide weight of load by 8
3½-inch ....divide weight of load by 10
4-inch .....divide weight of load by 12
4½-inch ....divide weight of load by 14
5-inch .....divide weight of load by 16
5½-inch ....divide weight of load by 18

The ideal load for the best all-around results is as follows:

3-inch tires..... 400 pounds
3½-inch tires..... 550 pounds
4-inch tires..... 735 pounds
4½-inch tires..... 960 pounds
5-inch tires.....1,200 pounds
5½-inch tires.....1,485 pounds

A load heavier than these figures can be carried but the pressure necessary to get good tire mileage is hard on the car.

Special Studebaker Bodies



Upper left—A special seven-passenger body that might be called an extended victoria. Lower left—Cloverleaf roadster showing a staggered arrangement of the seats. Upper right—The staid, formal seven-passenger with victoria top, used much for shopping and afternoon calls. Lower right—Roadster body with top similar to the extended victoria and novel lackey seat in the rear.

Buyers Get Individuality and Pay Less Than for Chassis and Similar Job When It Is Done Outside

BUYERS of Studebaker cars no longer are confined to the limitations of the stock bodies. Owing to the increasing demand for individuality in external appearance, the Studebaker company has made the departure of incorporating within its plant a custom body department in which the range of ideas of purchasers can be met with a corresponding style of body.

Heretofore motor car manufacturers who are classed among the big producers have done relatively a small amount of custom business and where it has been done the bodies have been bought from builders outside of the organization. In 1913 the Studebaker company started a body department of its own in which the stock bodies were made, but up to the present time the custom-made bodies have been purchased on the outside.

During the last year there has been a rapidly increasing demand for special body design and it has been felt that the expense of organizing the custom body department will be immediately met by the increasing demand for these bodies. This already has proven to be the case.

The method of procedure in securing the specially built bodies is for the purchaser to describe the type he desires. He is then furnished with a rough sketch prepared by the Studebaker designers and, when this is approved, it is drawn to full size before the structural drawings are made. In carrying out the work of producing these new bodies, several distinctive shapes already have been created, and in each case special styles of tops have been designed to accommodate the body contour.

Of chief interest to the purchasers of these bodies is that the selling price of the completed product is below the combined price of the chassis and a similar body purchased outside because of the elimination of the middleman's profit. The deviations from the stock body are not only in shape and seating arrangement, but also in color. The standard body is dark blue, while the custom-made bodies are finished in any color scheme that may be desired. The materials used in the construction of these special bodies are carefully selected in the same manner as they are for any of the custom body manufacturers, and although the price of these special jobs will range from $100 to several hundred dollars more than the stock body, there is an ever-increasing number of buyers who are willing to pay the difference.

Some of the special bodies which have already been produced are shown in the accompanying illustrations. One of these is a three-passenger Cloverleaf roadster which is characterized by the fact that the center seat is not placed as far back as is usual in the three-passenger Cloverleafs and hence allows a maximum amount of sociability in seating with the minimum of body length. The small compartments formed on either side of the center seat by its staggered arrangement are utilized for package carriers and can be reached by lids which set in from the top.

An example of special top construction is shown on a seven-passenger body. This is finished in red and the top itself is what might be called an extended victoria, as it opens with the exterior bows in the same manner as a victoria top, but the peak is extended to the top of the windshield. A top somewhat on this style is shown on

a custom-made roadster body which is fitted with a rather novel lackey seat in the rear. The extra seat is primarily intended to accommodate a servant and when not in use it is folded down out of view. The feature of the seat is that the part which folds up uncovering the seat well forms a convenient back rest for the occupant. A particularly wide door is used on this model and the curvature of the side line of the body is well worked out.

In the way of special roadsters, the four-passenger design has proven to be quite popular. One type is exceptionally roomy and almost approaches a close-coupled touring car with the exception that there are no rear doors, the entrance being through the front and between the divided front seats. No difficulty is found in seating two passengers in the rear seat of this body, as it is of generous width and far enough removed from the back of the front seat to allow the passengers plenty of knee room.

A rather staid and formal type of body is illustrated in the seven-passenger design with victoria top. This is quite a popular design with women who utilize it for afternoon calls and shopping, giving an effect of an open town car. As will be noted, it is equipped with bumpers both in the front and rear, in order to take care of the minor collisions which often occur under conditions of crowded traffic.

TO MAKE KEROSENE CARBURETER

Des Moines, Ia., Oct. 6—A carbureter attachment which can be fitted to any car and which will permit the use of kerosene will be manufactured by a Des Moines company, capitalized at $250,000, which has applied to the secretary of state for a charter and which will be known as the Trotter Kerosene Carbureter Co. Directors of the company are: H. S. Butler, vice-president of the Iowa National Bank; D. F. Witter, vice-president of the Iowa Loan & Trust Company; John Gilchrist, George Phillips, George Trotter, George A. Huffman and George W. Hartley.

The company is named for George Trotter, the inventor of the device to be manufactured. He is the inventor of a self-starter much in use by Ford owners. It is claimed for his new device that it can be used for either gasoline or kerosene and that it will increase the gasoline mileage by one-half while securing from kerosene the same mileage as for gasoline without the attachment. The factory is to be erected here and a force of from 50 to 75 men will be employed.

KILBORN LIBERTY SALES MANAGER

Detroit, Mich., Oct. 6—E. J. Kilborn, who in the past was the branch manager for the General Motor Truck Co. and the Mitchell-Lewis Motor Co., and who for the last 2½ years has been the manager of the Oakland Motor Co. Chicago wholesale branch, has been appointed general sales manager of the Liberty Motor Car Co.

Peace May Bring French Ford

Meanwhile the American Car Is to Enter France as British Made

PARIS, Oct. 9—There are indications that immediately after the war some of the leading French motor car manufacturers will endeavor to get into the low-price car trade and produce a car for the European and colonial markets capable of competing with Ford on a price basis. Arrangements are in hand for the formation of a $50,000,000 company at Lyons to produce cheap cars only. It is declared that Renault and Berliet, two of the leading manufacturers of France, are interested in this concern. A Lyons body builder is interested in the body-making section of the new factory and is about to visit America for the purpose of getting information and arranging for the purchase of machinery for producing bodies on a big scale.

Popular report credits other manufacturers with the intention of going into the low-price car business. Among the names mentioned is an important firm which had specialized in gearcutting before the war and has since increased its staff from 3,000 to 15,000. Factory development during the war has been phenomenal. One typical case is that of a well-known manufacturer who, just before the war, completed a new factory and laid plans for additions to be made during a period of 15 years. In the 2 years of the war he has attained the maximum he hoped to reach in 15 years and has had to buy new ground.

As all French motor car and kindred factories have increased since the war from 30 to 300 per cent, there is an impression that the possible output of cars will be considerably above the demands unless fresh ground is struck. There is a great danger of over-production when the new munition factories return to their ordinary work, and in some cases arrangements are being made to abandon motor cars for other branches of engineering. Marine engines, particularly the Diesel type, are looked upon as a good field, and are said to be attracting some car manufacturers. Undoubtedly there will be sensational developments towards the close of the war. The problem, however, of making the best use of the enlarged factories is a most difficult one and is calling for very careful thought on the part of manufacturers.

The French Ford company has purchased land at Bordeaux on which to build an erecting factory. Knock-down chassis from the Detroit factory will be assembled here as soon as possible. It is well known, however, that Ford has secured a big tract of land at Southampton, where all cars for the European market, it is said, will be produced. The English factory will then supply Bordeaux with units, and the Ford will enter France as a British car. As the allies will doubtless adopt a preferential basis of treatment, Ford will get in on the most advantageous conditions.

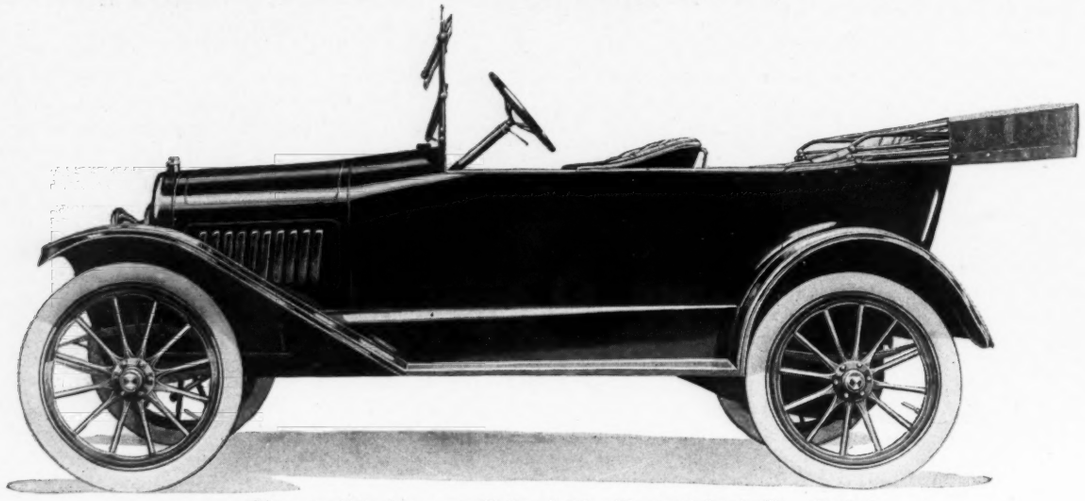
OMAHA CLOSED-CAR SALON

Omaha, Oct. 7—Omaha's closed car salon will be held in the main aisle on the ground floor of the Brandeis stores, November 1, 2, 3 and 4. Already there are about twenty dealers entered, with nearly forty exhibits, and these figures are expected to be doubled.

It is hoped to include every type of closed car in the exhibits, and many dealers who have not been handling the closed cars of their respective lines have ordered them for this show. The store will be kept open until 9 o'clock each evening, for show purposes only after the regular closing time, 6 o'clock.

This shows the Studebaker custom body department and the trimming work done there

Refined Metz Reduced $55



The new Metz has a ventilating hood with metal hood sills. Pockets have been placed in the rear-seat doors

THE 1917 Metz, made by the Metz Co., Waltham, Mass., is a manifestly improved car over its predecessor and yet it sells for $55 less, the new price for touring car and roadster being $545. The models contain no radical changes, but have been improved in appearance and have received little refinements which tend to make a thoroughly complete car.

The Metz provides a really surprising equipment and mechanical nicety for a car of such a low price. It is not that the company is working on any hair-raisingly small margin of profit, but is due to the friction transmission which has characterized the construction of this car since its inception. This simple form of drive, which has proven efficient on this lightweight car, costs a very small part of what gearset does, and the surplus is added to the rest of the car.

One Mechanical Change

In regard to the mechanical changes, the reciprocating parts of the motor have been lightened and that is the only change made.

The body lines have been slightly altered to improve the appearance of the car and a new ventilating hood has been provided with nickel-plated clamps. The new car has metal hood sills. A metal covered windshield board is fitted, black enameled, in place of the leather-covered board of the previous models. The steering column brackets have been strengthened and a light has been placed on the instrument board. Pockets are now a part of the rear-seat doors.

The new standard wheel color is vermilion with an option of white or royal blue. Wire or wood wheels are optional and demountable equipment is offered at $15 additional.

The writer was driven in one of the new cars through piles of crushed stone, which had just been dumped out of wagons, at a speed of 10 miles an hour on high gear, which, incidentally, has a 3 to 1 ratio. The motor was not laboring during any of this trying test. The full-elliptic spring suspension, aided by the coil-spring rebound checks, which are regular equipment, took away all appreciable throw from the car. The friction drive was thoroughly flexible when the driver was asked to demonstrate it, but anything but high gear was superfluous, although the drive was made through some truly bad roads.

Motor Is Mechanically the Same

The motor is a 3⅞ by 4, four-cylinder and is mechanically the same as it has been for several years, with refinements which have been embodied from time to time. Cylinders are L-head, block-cast.

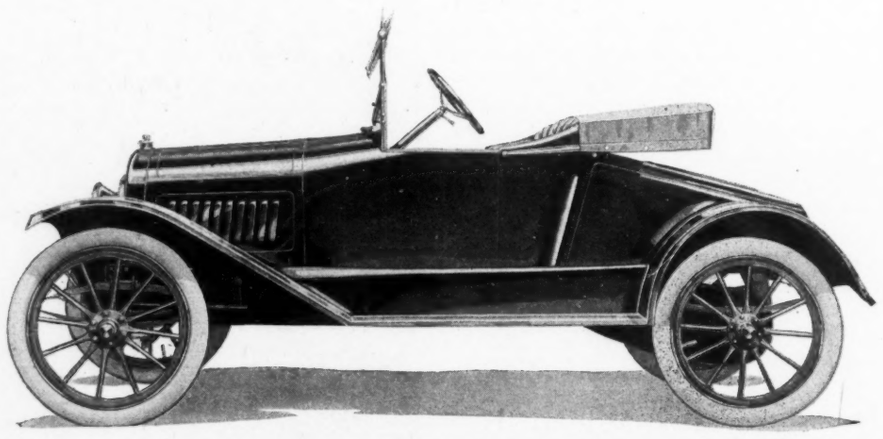
The starting and lighting system is Gray and Davis, two unit, and the starting motor will spin the motor in the coldest weather. The system is unusually ample for a car of this size and will stand an excessive amount of draw without discharging the battery. Ignition is by a Dixie magneto, with automatic spark control.

It is hardly necessary to describe the friction principle of drive in this car as it has been practically unchanged for a good many years. Enough to say that it is the simple flat disk against fibre-faced wheel type, with final drive through a wide silent chain enclosed within a heavy sheet metal housing and running in a bath of oil. It permits seven speeds forward and a reverse.

Tires are Goodrich 32 by 3½ standard clincher type and the wheelbase is 108 inches. The equipment includes a gasoline gauge in easy view from the driver's seat, a built-in rain-vision windshield, one-man top, A. W. T. speedometer, hand signal horn, etc. The finish is a baked-on black enamel. The complete car, without tanks filled, weighs 1,950 pounds.

LANCIA ADOPTS H. & N. CARBURETER

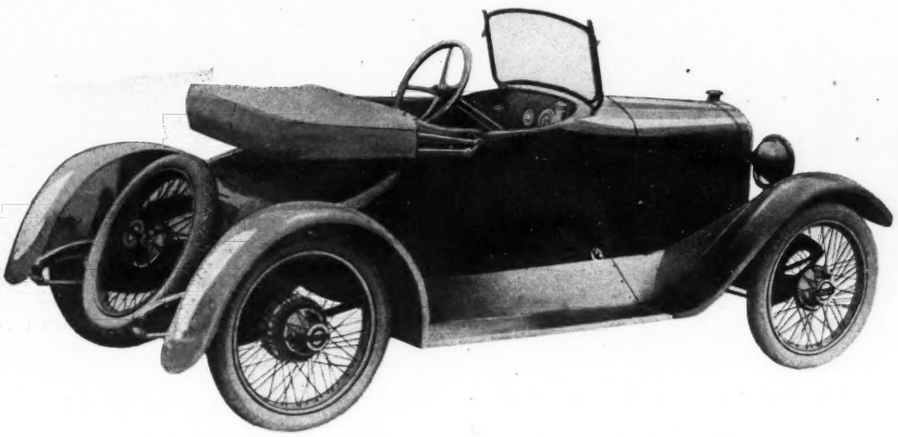
New York, Oct. 7—The Lancia Co. has adopted the H. & N. carbureter as standard equipment, the type used being of special design for this car.



The Metz roadster is placed on the same chassis as the touring car and sells for the same price, which is $545

Low Seats in Maibohm Roadster

Sporting Model at $695 Has Speedy, Rakish Lines



Maibohm roadster, combining low price, speed and comfort, with low-hung, racy body

THE Maibohm car built by the Maibohm Motors Co., Racine, Wis., has rather an unusual series of characteristics. Briefly, the makers have aimed to produce a roadster of low price which gives a combination of speed performance, smart appearance and comfortable seating. It is a very low built car with low seats having extra heavy upholstery, so that the passengers sit well within the body despite the rakish exterior. For the convenience of the driver a large range of adjustment is provided on the pedals, and the gear shift and brake levers are bent back so as to come within easy reach.

The engine dimensions are 3⅛-inch bore by 4-inch stroke and it is an L-head type having the cylinders and crankcase all in one iron casting. To reduce vibration as much as possible the crankshaft is 2¼ inches in diameter and the piston and connecting rod assemblies are carefully balanced and selected in sets of even weight.

Lubrication is cared for by a cam-operated, plunger pump which sends a pressure supply to each of the main bearings and also fills dip troughs under the connecting rods. The oil pan is pressed steel and is provided with a level gauge. Rather special pains have been taken to place the oil filler where it is readily accessible, and the illustration of the right side of the engine shows the size and position of the filling cap clearly. This same view also shows the location of the 12-volt Disco motor-generator which is driven by a silent chain from a sprocket mounted on the crankshaft just back of the main bearing at the flywheel end.

The manifolding is unusual, since the exhaust and intake are cared for by a single casting. This insures the supply of adequate heat to the gas and keeps warm the whole of the Zenith carbureter which bolts direct to the manifold. There are no internal passages cored within the cylinder casting, which permits a simple casting.

For ignition there is an Atwater Kent unisparker with automatic advance, mounted upon a vertical shaft that is driven from the rear end of the camshaft; this allowing the use of very short ignition leads. Cooling operates on the conventional thermo-syphon system without a pump, and it should be noticed that the tall, narrow radiator is especially well suited to this form of cooling.

In unit with the engine is a dry-disk clutch with 3 plates, and this connects to a three-speed gearset.

There is nothing unconventional about the axles, that at the rear being three-quarter floating. The 46 by 1¾-inch rear springs take both drive and torque. The frame layout is rather unusual, having all four springs mounted directly beneath it. The frame is 3 inches deep of ⅛ stock and is well kicked up over the rear axle. The wheelbase is 105 inches and the tires 30 by 3½ on either wood or wire wheels at the customer's option.

That special care was taken in designing the seat has already been mentioned, but there is another particular body feature, this being the provision of an extra large luggage compartment below the rear deck. This luggage case has a large door, closing flush and fitted with a Yale lock. The windshield is mounted with a rake and the one piece top folds down flat so that it accentuates the body lines. Optional colors are obtainable, an almost unheard of thing on a car costing only $695. The equipment includes a flush mounted speedometer, electric horn, rear tire carrier, tools, etc.

Worm-Driven, Non-Differential Axle

Empire 1-Ton Type for Solid Tires

A 1-ton worm-driven non-differential axle designed for solid-tire equipped trucks is the latest product of the Empire Axle Co., Dunkirk, N. Y. It is constructed to utilize the Hotchkiss principle of drive and torque taken through the springs. The weight of the complete axle is approximately 450 pounds.

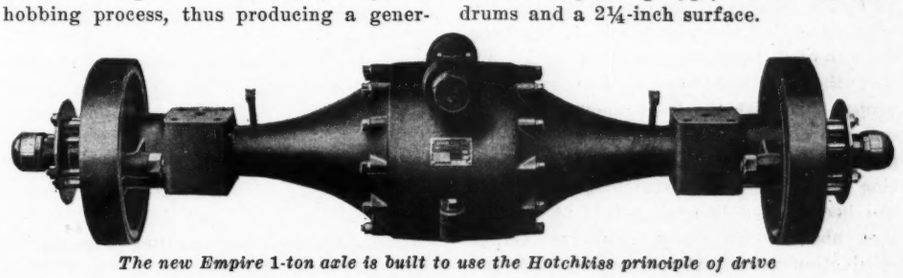
The features of the design is simplicity combined with sturdiness. Adjustments are eliminated and as there is no differential, this design eliminates working parts which the makers claim to be unnecessary in a 1-ton axle and provides better traction on slippery roads.

The worm and gear driving members are of the straight type. The worms are made of 3½-per cent nickel steel, and ground to correct tooth form. The worm gears are cast from phosphor bronze of an alloy embodying combined hardness and high tensile strength. These are cut by the hobbing process, thus producing a generated tooth, which makes a perfect fit in the worm.

The axle housing is constructed in three pieces which is regular practice in all Sheldon axles. The center housing carries the worm gearing as a complete unit and no adjustments are necessary after assembly. The housing is so designed that all mechanism runs in an oil bath and no grease cups are necessary as the brake shafts are oiled internally.

The worm thrust is taken on heavy-duty ball thrust bearings and the worm radial bearings are of the straight roller type. Wheel bearings are double-row radial and thrust-type ball bearings. No adjustments are necessary on any of the bearings.

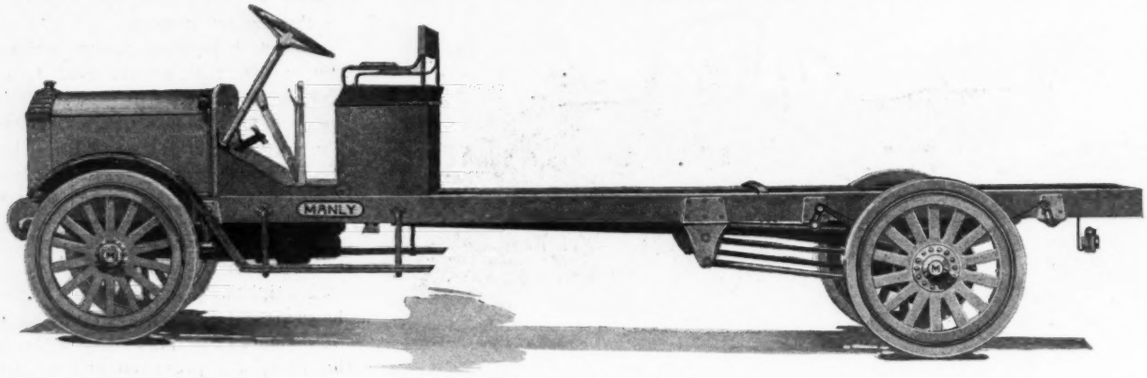
The drive shafts are of chrome-nickel steel, heat treated and ground. They are of the three-quarter floating type. The reduction is 7.2 to 1. Brakes are of the internal expanding type, with 13½-inch drums and a 2¼-inch surface.



The new Empire 1-ton axle is built to use the Hotchkiss principle of drive

Unusual Axle Suspension

Manly Truck Has Novel Features



View of chassis of the 2½-ton Manly truck

A newly designed series of motor trucks has been announced by the Manly Motor Corp., of Chicago, and the first models to appear are those of 1½ and 2½-ton rated load capacity. The two chassis are of similar specifications except for differences in size between the units, the 3,000-pound car being a smaller edition of its 5,000-pound mate.

The Manly Motor Corp. is capitalized at $600,000 and schedule deliveries from the Chicago factory will start in January. Five hundred trucks will be built during 1917 and will be marketed through dealers exclusively. Temporary downtown offices have been established at 1438 Michigan avenue, Chicago.

Several features in design are noted which have not, up to the present, appeared in truck practice in this country and other changes have been introduced which are a departure from methods generally adopted for performing certain work. These changes and additions are the result of the adoption of methods that have proven most practical, not only in the experience of the designers, but in use by many of the leading commercial cars on both the American and European markets.

Method of Taking Torque

Particular emphasis is placed by the makers on the system of combined radius and torque rod construction; also on the front spring mounting with relation to steering and on the gear ratios employed in the gearset. It is also pointed out that all parts, materials, specifications and heat treatments conform to the standards adopted by the Society of Automobile Engineers.

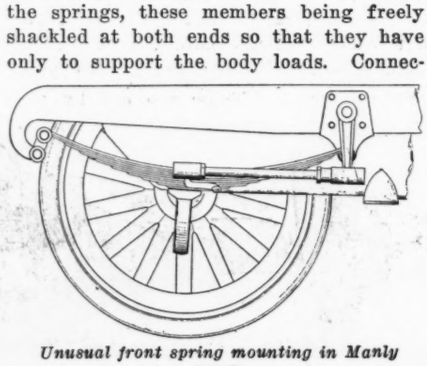
In designing the new trucks it has been the aim of the engineers to secure minimum operating and upkeep costs, to provide for proper care with the least amount of labor and to allow reasonably high speed together with constant service. In connection with the above statement attention has been called to such points as the entire absence of parts requiring either lubrication or adjustment underneath the body or frame of the cars, to the strength of the axles employed, to the size of the frames and to the ball bearings, all of which help the trucks to give constant heavy duty service.

One of the first features to be noticed is the front spring mounting. The more or less violent movement which is often imparted to the hand wheel with semi-reversible steering gears, and the strains imposed on the mechanism with irreversible design have been avoided by shackling the forward end of the front springs to the frame and pivoting them at their rear ends, thus reversing the general practice.

Steering Mechanism

By this method the end of the fore-and-aft steering rod, which is pivoted on the steering gear drop arm, is brought very nearly in line with the pivoted end of the spring so that the axle and the forward end of the fore-and-aft rod connected with the axle, are allowed to travel in practically the same curved path. Otherwise, with the older construction, the axle is caused to move with the spring around a center which is some distance ahead of the axle, while the steering rod and arm are forced to move around another center equally as far in the rear of the axle.

The method of connection between the rear axle and the frame of the truck marks another innovation in design. Neither torsion nor driving force is taken through the springs, these members being freely shackled at both ends so that they have only to support the body loads. Connection from the axle to the frame is made by means of a pair of rods on each side of the truck, the rods of one pair being placed one above the other and pivoted at both the axle and frame ends. The driving force passes through both rods, being taken from a point under the springs and in line with the axle center to a heavy steel bracket on the frame. The tendency of the axle housing to rotate, which is a natural result of the reaction of the wheels in driving, is resisted by these pairs of rods. This torque reaction compresses one rod and pulls on the other and because of their pivoted mounting it is impossible to place a bending strain on either rod. The upper and lower rods on each side of the car are not quite parallel with each other, their distances apart, front and rear, being so proportioned that the rear axle itself is caused to move in the curve that would result from an ideal condition of having radius rods as long as the propeller tube and having their front pivots in line with the front universal. Deflection of the rear universal is thus entirely done away with.

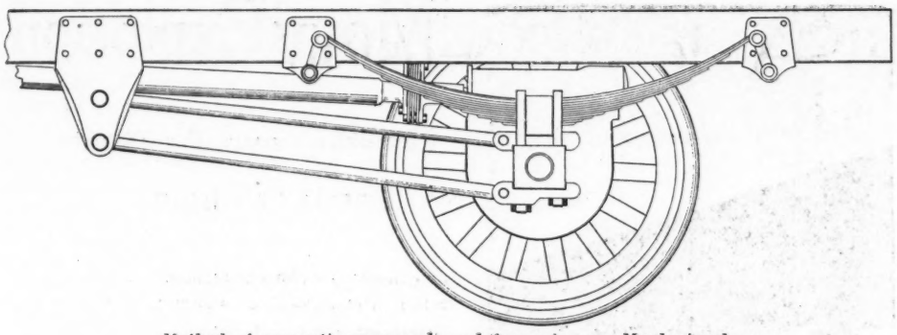


Unusual front spring mounting in Manly truck

One of the principal advantages claimed for this form of drive, as compared with the generally adopted radius rods or drive through the springs, is the reduction of the degree of false movement of the driving gears with reference to each other as the frame moves up and down.

Unusual Gear Ratios

It has been the experience of the designers of the Manley that the commonly used gear ratios do not best meet the requirements of hard service and because of this fact certain changes have been made in the Manly gearset. It is claimed that low, or first speed, does not always give sufficient reduction to avoid laboring of the engine when starting the load under difficulty and to meet this condition the total reduction between the engine and axle in low speed has been changed from approximately 30 to 1 as generally used to 35 to 1 in the 3,000-pound model and to 39 to 1 in the 5,000-pound car. As a



Method of connecting rear axle and frame in new Manly truck

further precaution, and to provide a reserve in case of emergency, the reverse gear has been changed from about 35 to 1 up to 46 to 1 in the smaller model and up to 52 to 1 in the larger car. A change has also been made in second speed, but in the other direction. This speed was primarily intended for hill climbing or for use in heavy pulling. The generally adopted ratio of about 18 to 1 has been changed to 13 to 1 in the smaller truck and to 15 to 1 in the larger, these new ratios allowing for continued use of this speed over long distances without harmfully racing the engine.

The engine in both models is of the four-cylinder block-cast type carried under a hood in front and is mounted on the frame at three points. The engine in the 3,000-pound car is of 4-inch bore and 5-inch stroke, developing 40 brake horsepower according to the manufacturers, while the 5,000-pound car is equipped with an engine of 4-inch bore and 6-inch stroke, developing 47 brake horsepower. The crankshaft and connecting rod bearings are of bronze, lined with Fahrig metal and the camshaft bearings are of phosphor bronze. All valves are on one side of the engine and are of tungsten steel in order to avoid the necessity of frequent regrinding. The exhaust manifold runs from the cylinder ports toward the radiator, then down behind the radiator and back to the muffler. Quick cooling of the burned gases, which is thus effected, assists materially in reducing back pressure and adds to the effective power of the engine.

System of Fuel Feed

The fuel system includes a Zenith carburetor with a fully enclosed governor, built in so that but one throttle valve is required and condensation and wire drawing of the mixture is avoided. Gasoline is drawn from a cylindrical pressed steel tank by a vacuum fuel feed system.

The radiator consists of a series of finned tubes enclosed in a cast shell which is flexibly mounted at three points. The fan and the rear of the radiator are enclosed by a sheet metal hood or funnel which insures a uniform flow of air even through the outer corners of the radiator surface and is designed to prevent dead spots at these points as well as at the radiator center.

The ignition, starting and lighting equipment is of Bosch-Rushmore make. The system includes a high tension magneto and a generator, mounted together and driven from the same shaft, but separate units electrically. The lighting and ignition switch and the ammeter are mounted on the dash plate. The starter, of the Rushmore type with electrically-meshing pinion, is mounted on the flywheel housing. The electrical units are connected to a 12-volt Exide storage battery.

Multiple-Disk Clutch

Power from the engine is taken through a multiple dry-disk clutch consisting of floating rings of Raybestos each having a surface area of 70 square inches, which are carried between splined driving and driven members of hardened steel. Outside adjustment is provided for the clutch spring and the clutch release lever is eccentrically mounted so that a gradually decreasing movement is secured during engagement.

The gearset is of the individual jaw-clutch type having the gears themselves always in mesh and securing the various speed changes through the engagement of corresponding pairs of dog clutches. One clutch of each pair is made integral with its gear while its mate is cut from the metal forming the shaft. It is possible to engage any gear ratio with practically no danger of gear stripping or breaking regardless of the relative speeds of engine and truck. The gearset is carried in a unit housing with the engine and clutch. The gearshift and brake levers, as well as the clutch and brake pedals, are mounted on the transmission case and have no connection with the frame of the truck.

The usual form of pin or block universal joint has been replaced in the Manly trucks by flexible couplings of the Thermoid-Hardy type having three arms apiece. The arms on one side of a joint are spaced equidistant between those on the opposite side. The arms of the rear coupling are spaced so that they come midway between those of the front member and in this way the periodic speed changes in the propellor tube due to the pins of universal joints moving from their vertical to their horizontal positions during rotation are avoided. This feature, together with the constant speed effect of the radius and torque arm construction which has been explained, causes a smooth and even rotation of the propellor tube. Careful balancing of the tube itself after attachment of the couplings, together with this steady rotation, eliminates vibration and consequent whipping of the tube. A desirable feature incidental to this form of coupling is its freedom from wear and the absence of any need of lubrication or adjustment.

The rear axle is of the worm-drive type. The housing is a steel casting in one piece from wheel to wheel. The worm, worm wheel and differential are assembled in a steel carrier which is mounted as a unit on the axle housing. Nickel-steel axle shafts are used, these shafts being 2⅜ inches in diameter for the 3,000-pound truck and 2¾ inches in the 5,000-pound model.

The frame in each model is of pressed steel and channel section. The frames are six inches deep and have flanges tapering from a width of three and one-half inches near the center to two inches toward the ends. The steel is ⅛ of an inch thick on the 3,000-pound car and ¼-inch thick on the 5,000 pound model. The wheels of the small car are all of 36-inch diameter, while on the two and one-half-ton model the front wheels are 36 inches and the rear 40 inches in diameter. Three wheelbase options are given; 156, 168 or 180 inches.

Equipment includes a driver's seat; electric head, dim, dash and tail lamps; complete tool set; horn; running boards and front fenders. The one and one-half-ton truck sells for $1,925 and the two and one-half-ton for $2,375. If electric starting and lighting is not desired a reduction of $125 is made from the price of either model.

COMMERCE TRUCK TO INCREASE

Detroit, Mich., Oct. 7—The stockholders of the Commerce Motor Car Co. have approved the proposition to increase the capital stock of the company from $200,000 to $400,000. A 1-ton model has been brought out by the Commerce company and 3,000 of these trucks are scheduled to be made during the next 12 months. The chassis with driver's seat will sell at $1,175. In addition to the 1-ton truck there will be made 1,800 ¾-ton trucks. The increase in business of the company has made it necessary to enlarge the plant, and an addition 60 by 250 feet is now being built.

REO SALES OF A YEAR

Lansing, Mich., Oct. 7—During the fiscal year 1916 the Reo Motor Car Co., delivered 23,753 passenger cars and the Reo Motor Truck Co., 2,551 trucks. All told 26,304 Reos were delivered to purchasers. The gross sales during the year totaled approximately $24,363,000 for the car company and $3,521,000 for the truck company or a total of $27,884,000 for all Reo sales. In the case of the passenger car company the increase over the fiscal year 1915 is 33.08 per cent and the increase for the truck concern is 33.38 per cent, or an average increase of 33.24 per cent for all Reo business.

Fuel Lifted by Motor Explosion

Church System Insures Constant and Adequate Supply Regardless of Speed of Engine

A NEW method of supplying fuel to the carbureter by gravity from a rear tank and one which has the assurance of a constant and adequate supply, no matter what the demand of the motor may be, has just been developed by Edmund S. Church, of the Automatic Carbureter Co., Chicago, the concern which developed the Compensating Vapor plug.

Fig. 1—Church tank on mast 10 feet 9 inches high feeds gasoline to carbureter at 55 miles per hour

The Church fuel-feed system, like the other systems for the same purpose developed within the past few years, involves a supplementary fuel tank which may be mounted on the dash or other convenient point, and from which gasoline is fed directly by gravity to the carbureter, and in which a float level is maintained.

Transfer of fuel from the main tank to the auxiliary tank is maintained by an automatically regulated pressure caused by the compression and explosion pressure in one cylinder. This pressure is obtained through a very ingenious check valve mounted usually in place of the pet cock in the rear cylinder and through which the burned gases maintain pressure on the main fuel tank and force gasoline to the auxiliary tank in the same way that fuel is forced directly to the carbureter in the conventional pressure system.

It has this distinction, however, that a constant gravity feed is provided to the carbureter and there is no hand-pump required.

A feature of the system, which will have the most general appeal, is the fact that an adequate supply of gasoline is assured to the carbureter even though the auxiliary tank be empty at the time of start, and even though the main fuel tank may have been open for filling and the pressure thus relieved. This comes about through the fact first that the fuel in the carbureter float chamber is more than sufficient to start the gasoline running from the main tank to the auxiliary tank, where it runs by gravity to the carbureter, and, second, that in the absence of sufficient fuel in the carbureter float chamber to start the engine, the operation of the starter for 15 seconds or less will generate pressure sufficient to put fuel in the auxiliary tank.

Fig. 2—Church tank installed on Mercer which was used for official A. A. A. test on Chicago speedway

A point that is considered most important by the inventor is the fact that being independent of engine suction, the engine can be run indefinitely on wide open throttle without diminution in the fuel supply, caused by the combined decrease in suction and increase in fuel demand which occurs with wide open throttle. On the contrary, the system is arranged so that increased demand on the auxiliary tank automatically permits increased pressure in the main tank, thus increasing the flow of fuel to the auxiliary tank.

American Automobile Association Test

That the system is capable of supplying fuel under conditions of maximum demand of the motor was demonstrated recently in an official A. A. A. test on the Chicago Speedway under the direct supervision of F. E. Edwards of the A. A. A. Technical Committee, and witnessed by a representative of Motor Age. In this test a Mercer roadster, model 22-70 fitted with the Church system was driven a distance of 10 miles in a total elapsed time of 0:27:58.4, an average speed of 75.4 miles per hour, with a maximum speedometer reading of 84 miles per hour. As may be imagined, this required wide open throttle practically the entire 10 miles, and there was no spitting or other evidence of starvation during the trial. At the end of this distance the auxiliary tank was still full.

The system is arranged so that the ordinary maximum pressure is not over 1½ pounds per square inch, but in the test referred to, the pressure as indicated by a gauge on the dash, ran up to nearly 3 pounds, indicating the automatic increase in pressure to meet an increased demand. In order to further illustrate this point, a Jeffery six touring car was fitted with a mast upon the top of which the Church tank was installed, so that the tank was 10 feet 9 inches above the level of the main tank. With the auxiliary tank empty, pressure relieved from the main tank and the engine dead, it required 14.4 seconds to get fuel into the auxiliary tank after the starter button was depressed, at the end of which time the pressure indicator showed a pressure of 1½ pounds per square inch. In running the car at a

speed of 55 miles an hour a maximum pressure of 3 pounds was registered.

Another advantage with which the system may be credited comes from the fact that the system is essentially a closed system, and neither the main tank or the auxiliary tank are open to the air, and consequently, there is no chance of taking in road dust. The system is closed in another respect, in that a vent is provided in the top of the auxiliary tank, but this vent is connected to the air-intake of the carbureter, so that any gas which evaporates from the system passes directly into the carbureter through the air intake, and thus adds its quota to the fuel supply instead of being wasted. Inasmuch as the evaporation of gasoline over a warm engine is a considerable fraction of the fuel possibility, this feature is an item of economy.

Fig. 4 shows the general layout of the system. In Fig. 3 is shown the cross-section of the Church tank on the right, and 2 shows the tank installed on a Mercer. In Fig. 4 it will be noticed that the pressure line is in the form of an inverted T with the check valve at one end and the main tank at the other and the Church tank at the end of the stem. It is in the Church tank that the pressure regulation occurs, and it is determined by the position of the float F. As the float descends with lowering of the gasoline level the stem S moves downward, pushing downward on pushrod R. This in turn seats the air relief valve and prevents pressure escaping through the condensing tube, so that with the float in its lowest position, all of the pressure from the check valve goes into the main tank.

When the float is at its upper position, the air relief valve is forced upward by the pressure, permitting the latter to escape through the condensing tube. The conical form of the air relief valve graduates the amount of pressure being used in proportion to the position of the float; that is, in proportion to the height of the gasoline level in the auxiliary tank. It will be noted that a gasoline check valve is provided at the gasoline intake and operates in harmony with the air relief valve. It will also be noted that cleaning arrangements are accessible, for the sediment screen can be removed without disturbing the tank, as can the air relief valve.

Church attributes the possibility of this system to the design of the check valve. This is a flat nickel disk, $\frac{1}{32}$-inch thick, and having a maximum opening of only .003-inch. It is calculated that the valve takes approximately .005 of the cylinder volume.

At first thought it would seem that the introduction of exhaust pressure into the gasoline tank might be dangerous on account of the heat of the exhaust gases. So far as can be determined, however, there is no possibility of heat reaching the gasoline tank with the pressure line removed and the hand held directly in front of the pressure outlet from the check valve, the heat was no more than slightly noticeable. The hand could be held on the pressure line close to the check valve at any time without discomfort, even with the engine racing. This is accounted for by the fact that there is such an enormous reduction in pressure.

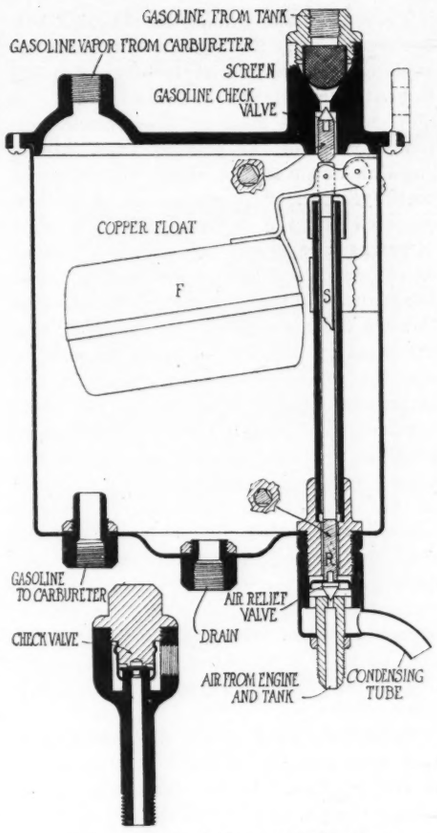


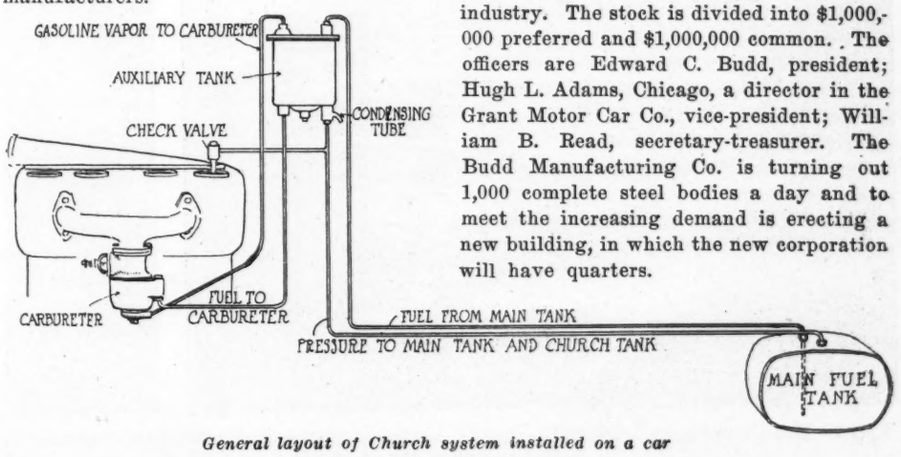
Fig. 3—Cross section of Church tank actuated by explosion or compression

ACCESSORY MAKERS BANKRUPT

Detroit, Oct. 8—Bankruptcy schedules listing liabilities totaling more than $100,000 were filed yesterday in the United States District Court by the Victor Manufacturing Co. and Ackerman and McNamara, two Detroit motor car accessory manufacturers.

The Victor Manufacturing Co. is a Michigan corporation with its main plant in Detroit. It listed its total liabilities at $77,807 and assets comprising land and machinery at $114,724. The schedule was filed by Franklin T. Chapman, secretary and treasurer of the company. Adjudication was made September 18 on petition of the Beard & Sons Co. and others.

Ackerman & McNamara, whose plant is located at 535 Franklin street, Detroit, listed their total liabilities at $39,606 and assets at $5,201. Adjudication was made August 29 by the American Leather Manufacturing Co. and others.



General layout of Church system installed on a car

MAIBOHM TO INCREASE OUTPUT

Racine, Wis., Oct. 7—The Maibohm Motors Co., this city, which makes the Maibohm roadster selling at $695, has booked orders for 3,300 cars, with deposits from dealers, both here and abroad. The company is now endeavoring to purchase additional material to get its production up to the 3,000 mark for the first year.

At the present time the factory comprises some 110,000 feet of floor space. At a capacity of fifty cars a week, it will employ 300 men. The factory capacity is capable of handling about 8,000 cars per year. The present plant was secured in April, this year, and cars are now built at the rate of twelve a week, or 2,000 for the coming year.

The Maibohm company is an outgrowth of the Maibohm Wagon Co., which for 30 years has built vehicles. Experimental work on the first Maibohm car was commenced about 2 years ago. About a year ago the first car was perfected and for 70,000 miles was put through a severe test on the road with 800 pounds of pig iron for rear ballast.

BUDD WHEEL INCORPORATED

Philadelphia, Pa., Oct. 9—The Budd Wheel Corp., Philadelphia, has been incorporated for $2,000,000 to manufacture steel and wire wheels of its own design and patent. Since August the company has been turning out wheels in a small way. Charles Schenck, formerly with the Burdette Roundtree Co., and well known in the railroad business, will have charge of the new industry. The stock is divided into $1,000,000 preferred and $1,000,000 common. The officers are Edward C. Budd, president; Hugh L. Adams, Chicago, a director in the Grant Motor Car Co., vice-president; William B. Read, secretary-treasurer. The Budd Manufacturing Co. is turning out 1,000 complete steel bodies a day and to meet the increasing demand is erecting a new building, in which the new corporation will have quarters.

Priming Is Made Easy

New Device Makes Possible Exact Control of Gasoline

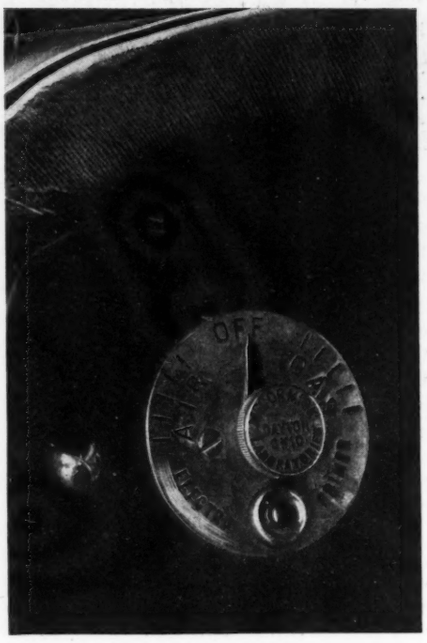
Dial on Cowl Board Is Used for Regulation

TO PRIME a cold engine accurately for starting is a certain amount of trouble and it requires some skill to determine that just the right quantity of gasoline is introduced. Further, the best place to prime is directly into the cylinders, and it is impossible to inject through compression cocks without lifting the hood and dirtying the hands. The McCormick Laboratories, Dayton, Ohio, have secured patents on a very accurate device which measures a precise quantity of gasoline which it transfers into a pipe and thence to the cylinders successively during the suction stroke.

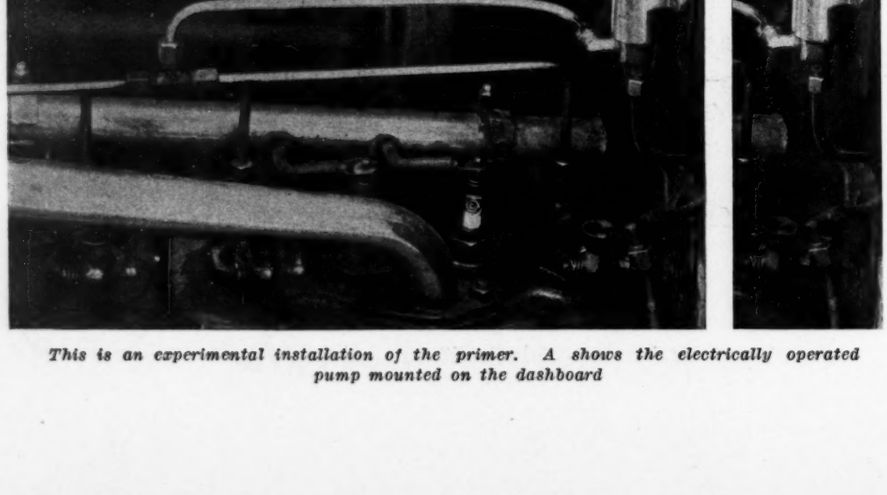
Beginning at the cylinders there is a small check valve screwed into a valve cap or other convenient place and these check valves are all joined to a tube running along the cylinder top. The valves open during the suction stroke, but are kept closed as long as there is any pressure within the cylinder. From the middle of the standpipe connecting the check valve a second pipe runs to an electrically-operated pump mounted on the dashboard. This pump has a suction line connected to the main gasoline supply somewhere near the carbureter and the plunger is lifted by a solenoid when current is switched on. On the cowl board there is a dial with a button controlling a cock on the supply side of the pump and beneath this turn button there is a knob which sends current around the solenoid of the little pump when it is depressed.

To operate the primer the knurled button is turned to the right and the electric button depressed for an instant. Sending current through the solenoid lifts the plunger and as soon as the electric button is released the plunger falls driving gasoline down to the check valves above each cylinder. The starter pedal is then operated and the engine sucks in charges of gas as it revolves. As long as the finger on the cowl dial is kept on the right side the suction will continue to draw gasoline through the little check valves direct from the main supply line so it is possible to run the engine indefinitely without the carbureter coming into action. As soon, however, as the engine starts it is usually possible to turn off the supply to the primer by bringing the pointer on the cowl to the off position. The same instrument can also be used for supplying additional air. By turning the pointer to the left instead of to the right the check valves are put in communication with the atmosphere instead of with the gasoline line so that on each suction stroke a small quantity of air is drawn direct into each cylinder.

Since both sides of the dial are graduated it is possible to make small changes in the mixture. If the carbureter gives a weak charge, as it would usually do when very cold, the pointer is kept a little on the right side so that extra gasoline can be taken direct into the cylinder. If the carbureter is supplying too rich a gas then the pointer can be set over the other way and air admitted in just sufficient quantities.



Dial on cowl board, showing how supply cock and current are controlled from driver's seat



This is an experimental installation of the primer. A shows the electrically operated pump mounted on the dashboard

CHALMERS DEALERS HOLD SCHOOL

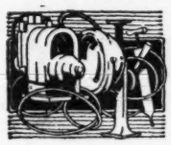
Denver, Colo., Oct. 9—A free school, presenting the principles of motor car construction and operation, has been started by E. J. Johnson, Chalmers distributor for Colorado and Wyoming. Afternoon and evening classes are conducted in his salesroom, and the attendance has been at least twenty-five each session thus far. A Chalmers chassis is torn apart and put together, every working principle and mechanical theory being carefully explained and demonstrated. The classes are taught by C. R. Schnorr, a Chalmers factory engineer, and the course is open to anybody, whether car owner, driver, salesman, prospective buyer or just someone interested in the work from an educational standpoint. Questions are answered about mechanical features of other makes of cars as fully as possible. Some favorable prospects already have developed.

NO SPECIAL HUBS IN WHEEL

The Simplicity Demountable Wheel Co., Grand Rapids, Mich., has called the attention of Motor Age to an article in the issue of September 28 descriptive of the demountable wheels for Fords, manufactured by this company, in which the impression was conveyed that special hubs were a necessity in this equipment. As a matter of fact the device is a patented ring or bolt retainer, which is attached to the hubs already on the car. The installation is comparatively simple. The device is placed on the inside of the hubs and securely fastened, the bolts of the retainer ring going through the same holes as the original bolts used in securing the wheel to the hub. These bolt holes and hub holes are reamed a little in order to facilitate changing.

DINGLEY TO SELL MITCHELL

Los Angeles, Cal., Oct. 6—Bert Dingley, former racing driver, has been appointed factory representative on the Pacific coast for the Mitchell Motors Co.



The Accessory Corner

Nitrojector Searchlight

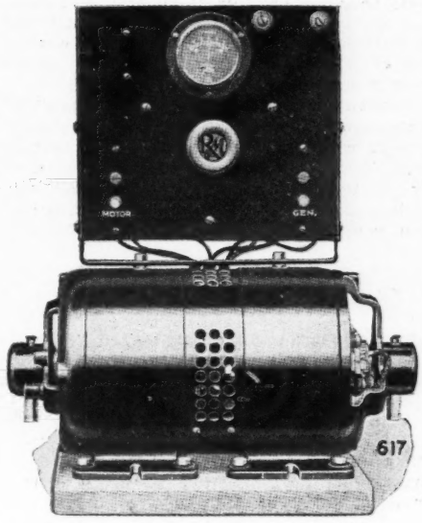
THE Old Sol nitrojector No. 100, a windshield searchlight, has three patented features which are innovations in spotlight construction, and probably the most interesting one is the double-cylindrical shutter which is designed to eliminate glare with the power of the searchlight still being maintained. The claim is that the lamp will project 1,000 feet ahead and still not be blinding. The shutter is manipulated with a thumb screw on the outside which operates a threaded shaft on which the lower end or lamp end of the cylinder is placed. As the screw is turned the shutter gradually recedes, so enveloping the bulb until only the rays from the bottom of it can escape. At this setting a thin ribbon of light is projected which, it is said, will spread out 500 feet from the car to a diameter of about 4 feet. Another feature is the readily adjustable focus. The operator can handle the lamp in the same way a motion picture machine is operated. That is he can focus it to any size circle. A diminishing mirror for seeing back of the car is standard on the light. The nitrojector is made of pressed steel, is black enameled with three baked-on coats and is equipped with a patented universal joint that the manufacturers guarantee can be instantly adjusted to take up wear. The light sells for $10, fully equipped with mirror and 6 feet of cable and terminals. It is the latest offering of the Hawthorne Mfg. Co., Bridgeport, Conn.

Two Lights in One Bulb

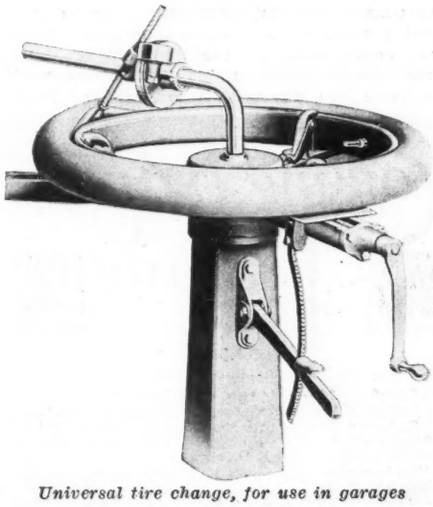
A minor and a major filament within one bulb is the latest offering for dimming of lights to comply with city ordinances. With the bulb inserted in the lamp with the minor or smaller filament above the more powerful one, a diffused, but fairly bright light is projected to the roadway at a short range. The major filament gives a powerful headlight for country driving. Another type has the minor filament mostly surrounding the major and diffuses the light in a general way, covering eight to ten times the area of the major filament when lighted. Tulite Auto Bulb Co., Detroit.

Robins and Meyers Chargers

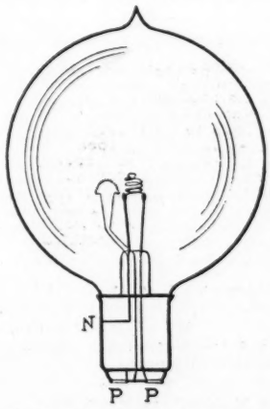
A new battery-charging outfit has been developed by the Robbins & Meyers Company, Springfield, O. The outfit is made especially for charging motor car and motorboat batteries and is supplied in three to 15 or 30 volts, as desired. The motors of these sets are furnished to operate from 115- and 230-volt direct current circuits or 110- and 220-volt alternating current of 25, 30, 40, 50 or 60 cycles. The 80- and 250-watt sets are furnished to charge up sizes, 80-, 150- and 250-watts. The 80-watt outfit will generate charging current in voltages up to 8 volts and the 150- and 150-watt sets are light in weight and suitable for portable service. They are provided with an oak sub-base so they can be placed on the running board of a car without injury to the finish. The 250-watt sets are not provided with the wood base as they are built for installation in a permanent position. The sets are regularly furnished with a steel switchboard, which is mounted on the frame at the top. This switchboard is provided with an ammeter in the generator circuit which shows the charging amperes, a rheostat in the generator field to regulate the rate of charge, a push button switch in both the motor and generator circuits, a fuse block with fuses in the motor line and terminals for connecting the motor to the line and the generator to the battery leads.



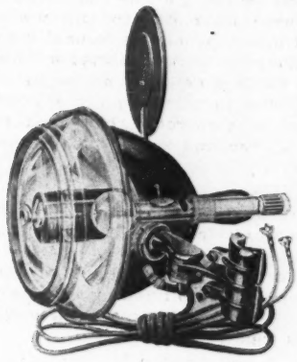
Robins & Meyers outfit for charging small batteries



Universal tire change, for use in garages



Light bulb which embodies a dimming filament



Searchlight with adjustable focus

Universal Tire Changer

The Weaver universal tire changer is a garage device designed to permit rapid removal and replacing of any kind of tires. In split rim types there is a toggle joint which is applied to the rim near the split which contracts the rim. When a new tire is mounted the action of the jaws which embody the toggle joint is reversed so that the rim is expanded and the latch may be put in the proper position. In clincher types of rims there is a roller arm which fastens into the main arm of the machine, the end of which is inserted under the clinch. Then the arm is revolved and the clinch is peeled off. In quick-detachable types where the tire is locked with a ring, a roller in the arm of the device is applied to the adapter ring of the rim. The pressure of the roller breaks the adapter ring away from the lock ring so that the two may be readily lifted off by hand. The arm carrying the roller is rotated around the rim, as in the other methods, to perform this operation. The advantage claimed is, of course, that the time consumed in changing tires is greatly reduced. The Weaver Mfg. Co., Springfield, O., is the maker, and the list price is $44.

From the Four Winds

MAKES Locomotive from Car—Not satisfied with the 12,000-mile record of a light motor car he had been driving, the manager of a Texas mine changed its wheels and made it into a locomotive to haul mine cars.

Pennsylvanian Invents Kerosene Carbureter—For 6 weeks a runabout owned by Captain U. G. Lyons, president of the Warren, Pa., Chamber of Commerce, has been run by kerosene. The carbureter which he uses was made in Warren and is said to have proved satisfactory.

Pennies Deck Running Board—Pedestrians and others on the streets of Los Angeles, Cal., looked twice recently when they saw a motor car with 100,000 pennies in sacks on the running boards driven by a pretty young woman. The apparently wanton display of so much money constituted an advertising stunt for a penny dance arcade.

Touring Proves Paying Luxury—After a recent experience in touring, Garnett Andrews, Chattanooga, Tenn., is willing to agree that it pays to travel, according to the record he made. The party of six made the trip between Chattanooga and Haven, Me., in a Cole eight, and incidentally brought back an economy record. The total cost, including hotel, gasoline, tires, driver's salary and a fine of $12.50 for speeding in Pennsylvania, was $511.93, or 3½ cents a mile for each person.

Minneapolis Attracts Tourists—More than 100 motor parties visit Minneapolis daily, according to a count kept by the Automobile Club of that city. As many as that have been cared for daily at the club's headquarters, and about fifty parties have obtained information there daily. The situation of Minneapolis on two national highways, the Yellowstone trail and Jefferson highway, is given as one reason for this popularity. Every extreme of the United States was represented during the season just closing. The number was greater during the latter part of July and the forepart of August than during any other time.

Car Prevents Railway Disaster—Driving an Overland across the prairie at a 60-mile clip, overtaking an engine running wild, enabling the engineer to leap from the motor car to the engine, was the feat recently performed by Miss Ada Taylor, Tenino, Wash. The engineer and brakemen on the Badger Lumber Co.'s logging train were making a flying switch. The engineer slowed down his train and threw the switch himself. In passing over the frog the jar threw the throttle wide open and the locomotive took the Northern Pacific main line with a full head of steam. Miss Taylor saw the wild engine as it passed her home, picking up the pursuing engineer, overhauling the engine and keeping pace until the engineer was once more master of the situation.

With the Motor Clubs

Batavia, Ill., Forms Club—The Batavia Automobile Club started its work the night of its formation by planning to place warning signs on the streets at points where the danger is great. More than thirty joined at the initial meeting, and a goal of 100 was set for the next meeting.

Traffic Problem Interests Canada—With a view of seeing what can be done regarding the enforcement of traffic regulations and educating motorists on the rules of the road, the Ottawa Valley Motor Car Association, Ottawa, Ont., will forward to the police commissioners several recommendations which they feel would eliminate many evils now existing. The association believes that as a body they can be of great assistance in helping to better traffic conditions, and with the coöperation of the police minimize many of the evils which now exist and which often endanger pedestrians.

Vancouver Club Presents Trophy—The Vancouver Automobile Club recently offered a gold trophy to the one making the trip from Vancouver to Winnipeg. It was won by H. W. White, of Vancouver, who, together with his wife and daughter, made the trip in a Cadillac, finishing it in 64½ hours' actual running time.

Good Roads Activities

Quaker State to Pave Roads—The Pennsylvania state highway department is having plans prepared for brick paving on the Johnstown and Ebensburg roads. The cost will be $150,000.

Duluth-Canadian Road Nearly Complete—The highway from Duluth, Minn., to Port Arthur and Fort William, the cities at the Canadian head of the lakes, soon will be completed and ready for travel.

Minnesota Reviews State Highways—State mileage is 12,300, according to the Minnesota state highway commission. Under special assessment and bond issue 1,133 miles are being built. Of the total mileage 3,400 are main-traveled roads between county seats or into lake recreation districts. State aid has been paid to January 1, 1916, on 2,590 graded roads, 1,414 graded and surfaced, 900 being graveled and surfaced and 1,600 miles graded this year.

May Spend $50,000,000 on Roads—If the bond issue of $50,000,000 proposed for improving the highways of Pennsylvania is obtained, an amendment of the state constitution will be necessary. The size makes this necessary, and the coming session of the State legislature is expected to consider it.

Where Roses Fence Roads—Los Angeles county, Cal., now boasts of roses which line one broad boulevard for 18 miles. About 200 miles of road in the county have ninety rose trellises to each mile. Poppies and geraniums are also planted along the roads, and eucalyptus trees have been set out to break the monotony where necessary.

Clubs to Mark Roads—The civic and motor clubs of Rock Island, Ill., are to complete the marking of the Logan-Lee highway and the Diagonal trail between Rock Island and Peoria. The Logan-Lee is already well marked and they expect to finish the work in a few days. Appropriations have been made by the county and state for road work on these two highways.

Good Roads Day, October 21—Milwaukee county, Wis., is planning an object lesson in good roads. A special ceremony October 21 will celebrate the progress already made in the building of highways. Good roads experts from over the United States are expected to attend. A parade will follow the best roads under the direction of the county supervisors.

Texas Citizens Give Road Money—Colonel W. H. Harvey, president of the Ozark Trails Association, has been notified that citizens of Amarillo, Tex., have raised $5,000 and deposited it in a bank there, to be used in extending that branch of the trails to join the Santa Fe trail in New Mexico. Colonel Harvey is making an inspection tour of the Oklahoma stretches of the trails.

Cement Road Is Started—Work has been started on a $75,000 piece of cement road to extend the first 5 miles west from Denver on the West Colfax avenue road to Golden. This is the southernmost of the three main roads between Denver and the Golden entrance to the city's municipal mountain park system in the foothills. It is also the shortest, but has never been made into a good road.

Wants $75,000 for Roads—Pine county, Minn., is trying to raise $75,000 and to obtain a like amount of federal aid to grade and gravel the Duluth-Twin Cities highway, which runs through the county. It is claimed all the state appropriation is needed to maintain the 50 miles of road in its present condition, and this money is wanted for graveling, so that the maintenance cost will not be so much.

Coming Motor Events

RACES

—1916—

*October 14—Chicago speedway race.
October 19—Indianapolis speedway race.
October 21—Track meet, Kalamazoo, Mich.
*November 16—Vanderbilt cup race, Santa Monica, Cal.
*November 18—Grand prize race, Santa Monica, Cal
*November 30—Speedway, Los Angeles, Cal.
*December 25—Speedway, Los Angeles, Cal.

—1917—

May 19—Metropolitan Trophy, New York speedway.
†May 30—Indianapolis speedway.
†June 9—Chicago speedway.
June 23—Cincinnati speedway
†July 4—Omaha speedway.
†July 14—Des Moines speedway.
†July 28—Tacoma speedway.
August 4—Kansas City speedway.
†September 3—Cincinnati speedway.
†September 15—Providence speedway.
†September 29—New York speedway.
October 6—Kansas City speedway.
October 13—Chicago speedway.
October 27—New York speedway.

* Sanctioned by A. A. A.
† A. A. A. championship events for 1917.

MEETINGS

January 9-11—Mid-winter meeting, Society of Automobile Engineers.

SHOWS

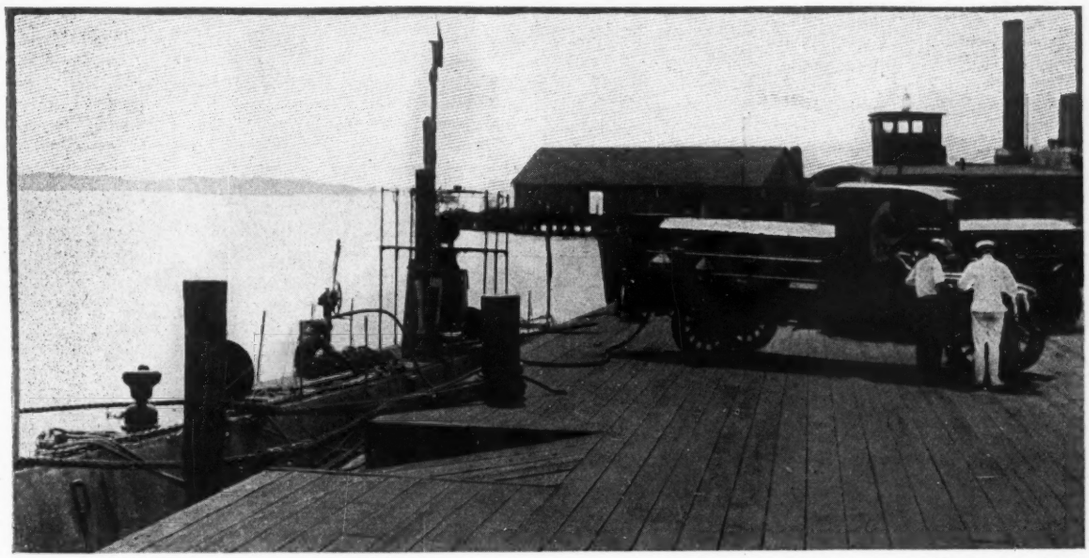
October 14-21—Pittsburgh, Pa.
October 14-31—Dallas, Tex.
October 15-November 1—Omaha, Neb., closed car salon.
January 6-13—New York show.
January 13-20—Montreal.
January 27-February 3—Chicago show.
February 18-25—St. Louis, Mo., show.
February 26-March 3—Omaha, Neb., show.
March 3-10—Boston.
March 6-10—Fort Dodge, Ia., show.

The Show Circuit

Pittsburgh, Pa., Show—The thirteenth motor show to be held by the Automobile Dealers' Association of Pittsburgh opens October 14 and lasts a week. Seventy-five makes of cars, ranging in price from a few hundred dollars to more than $5,000, will be shown.

Minneapolis Show—Any fears as to the holding of the Minneapolis show this year have been dispelled since the National Lamp Company has offered the use of its building at Broadway and Marshall. When the armory was condemned, there was doubt that a suitable building could be obtained.

Among the Makers and Dealers



TRUCKS SUPPLY SUBMARINE WANTS—Trucks make it unnecessary for naval craft to lie at the docks for long periods awaiting the arrival of supplies. On arriving at the dock a long section of rubber hose is used to transfer the load direct to the fuel compartments of the vessel. The illustration shows a tank truck at the dock in New London, Conn., delivering fuel to the United States submarine D-1 shortly before the submersible left port to participate in the naval pageant and maneuvers of the Atlantic squadron.

NEW Roamer Agency in Los Angeles—The Motors Distributing Co. has been formed as the sales agency for the Roamer car in the territory of Los Angeles.

McCurdy to Distribute Jordan—Robert McCurdy, who for 10 years sold Pierce-Arrow cars in Pittsburgh, has become the Pennsylvania state distributor for the new Jordan car.

Ohio Agency for Prismolite Lens—W. R. Jones & Co. have taken the central Ohio agency for Prismolite lens manufactured by the Standard Glass Specialty Co., Morgantown, W. Va.

Knickerbocker Manager Resigns—H. H. Murden, general manager and engineer of the Knickerbocker Motor Truck Mfg. Co., New York, has resigned to join Oliver Bros., Inc., purchasing agents, New York.

Another Agency for Albuquerque, N. M.—The J. S. Morrison Auto Co. has opened a show and salesroom with the White Garage and will handle the Allen car. Headquarters for this firm are in Denver. The local branch will include all the state of New Mexico as territory.

Kelsey Wheel Adding—Extensions to the plant of the Kelsey Wheel Co., Detroit, Mich., are to be started within a few days, and when completed will provide at least 50 per cent more manufacturing room. Two buildings, both 140 by 600 feet, will be put up and when ready for occupancy the working force which now totals about 2,000 men will be increased by 500 to 700 men and eventually to 3,000.

Studebaker Appoints Wiese Branch Manager—John S. Wiese has been apponted branch manager for the Studebaker Corp. in Buffalo. He succeeds J. O. Hahn, who formerly operated the Studebaker branch in Cleveland and who is now the treasurer of the Studebaker Sales Co., which is the result of the merger of the Blevins Auto Sales Co., of Toledo, and the Davis Motor Car Co., of Cleveland. Mr. Wiese was recently manager of the Winton branch in Los Angeles and before that was a branch manager for 7 years with the United States Rubber Co.

Perrin Leaves Timken Detroit Axle Co.—J. G. Perrin has resigned from the Timken Detroit Axle Co., owing to serious illness.

Resinger Resigns Agency—N. B. Resinger, formerly purchasing agent for the Argo Motor Car Co. and who became purchasing agent for the Brisco Motor Corp., at Jackson, Mich., has resigned.

Moesta Represents Service Bureau—H. G. Moesta, who was for several years connected with the sales and service departments of the United States Tire Co., has been appointed middle western representative of the Wallace C. Hood Service Bureau, Detroit.

L. S. Bache Dies—Leigh Stanley Bache, Bound Brook, N. J., died at Muhlenberg Hospital, Thursday, September 21. Mr. Bache came to Bound Brook in 1889 and since that time has been connected with the Bound Brook Oil-Less Bearing Co., for the past 5 years as first vice-president and general manager of that company.

Elgin Corporation Increases Factory—Though the Elgin Motor Car Corporation, of Chicago, is yet young, their business has grown to such an extent that they have been forced to increase their floor space more than 500 per cent within the past 80 days. Counting other buildings about to be constructed, their floor space will be increased an additional 200 per cent in the next 60 days.

Saxon Agency Supplants Branch Distribution—Distribution of the Saxon in New York City and surrounding territory, formerly in the hands of a factory branch, has been taken over by the recently-organized Saxon Motor Car Corp. G. S. Morrow is president and general manager of the new sales organization. He has been actively connected with the motor industry since 1903, when he joined the Michigan Storage Battery and Auto Supply Co. In 1905 he left this company to open a garage and service station in New York. In 1910 he went with the Olds Motor Works as special representative.

Holihan Increases Capital—The Holihan Mfg. Co., Detroit, Mich., manufacturer of radiators and other parts, has increased its capital stock from $80,000 to $100,000.

Roth Joins the Clear-O-Scope Co.—Joseph Roth, formerly manager of the Chicago branch of the Sears-Cross Co., is now general sales manager of the Clear-O-Scope Co., with headquarters in Chicago. The company has increased its manufacturing plant.

Goodyear Agent Makes Change—J. V. Harding, who was formerly the Detroit factory representative for the Goodyear Tire and Rubber Co., of Akron, O., has left the tire field to become the general manager of the Neville More Room Steering Wheel Co., which is marketing a new wheel that slides on the pressing of a button and thus allows exit and entering room in the driving compartment.

Novel Plan for Scripps Distribution—Beginning October 2 Wilbur H. Collins, head of the Michigan Oldsmobile Co., which now has the Detroit agency for the Scripps-Booth with a territory covering the state, is sending one of the new eight-cylinder Scripps-Booth cars on a trip that will include every city and town of importance in Michigan. The purpose of the tour is to bring the car to the attention of every dealer in the territory. The trip will last until Christmas.

Morgan-Farr Agency Formed—A new motor car sales agency was started this week in Newark, N. J., the Morgan-Farr Motor Co., inc. W. J. Morgan, who has been connected with motoring in one way or another since the start of the industry, will be president and manager of the company, while Charles J. Farr, Bayonne, N. J., formerly distributor of the Stutz, will be vice-president and treasurer, and his son, Roy C. Farr, will be secretary. The new company will sell

the Saxon car in Essex and part of Hudson and Union counties and the Monroe in nine counties.

Locomobile Dividend Declared—The Locomobile Co. of America has declared a quarterly dividend of 1¾ per cent on preferred, payable October 2 to holders of stock on record at close of business September 30.

Tompkins Is Philadelphia Representative—W. M. Tompkins has been made Philadelphia representative of the Ward Leonard Electric Co., of Mount Vernon, N. Y., with headquarters at Philadelphia, Pa.

Hill Joins Curtiss Company—Walter G. Hill, former secretary and treasurer of the S. V. G. Automobile Co., Reading, Pa., has become superintendent of purchases for the Curtiss Aeroplane and Motor Co., Buffalo.

J. H. Ramsden Becomes Oakland Branch Manager—J. H. Ramsden has been appointed to succeed E. J. Kilborn as manager of the wholesale branch of the Oakland Motor Car Co. in Chicago. Mr. Ramsden joined the Oakland organization a few months ago. He was previously manager of the St. Louis branch of the J. I. Case Plow Works.

Schaniel Goes to Service Bureau—J. H. Schaniel, former manager of the Wolverine Automobile Club, of Detroit, who resigned that position to become sales manager of the Gerlinger Motor Car Co., Portland, Ore.; Seattle, Wash., and Tacoma, Wash., has resigned the latter position to join the forces of the Wallace C. Hood Service Bureau, Detroit. He has been appointed northwestern representative for the bureau and will cover the states of Minnesota, North and South Dakota, Montana, Oregon, Washington, Idaho and California.

Michigan Stamping Addition Ready—Work is progressing rapidly on the new plant of the Michigan Stamping Co., Detroit, Mich., and by October 15 it is expected that it will be ready for occupancy. It will be one of the biggest plants constructed in that city this year, being 650 feet long and 370 feet wide. More than 1,000 men will be employed, and this force will eventually be doubled. The total expenditure will be approximately $1,000,000 in buildings, general equipment and new machinery. The company makes frames, gasoline tanks and many other parts for the motor car industry.

FILLING STATION FOR BOSTON'S SMART SET—This shows the luxurious Texaco gasoline filling station which has been constructed on Commonwealth avenue, Boston, in the finest residential district. A large tank is under the concrete platform, on which four pump towers, set at right angles to the street, are lined. A driveway runs completely around the station and eventually will be extended through Beacon street, the next thoroughfare to the south, so that motorists will have easy access to the station from these two important streets. Each tower is painted a bright red and is surmounted by four electric lights. Two or more uniformed attendants are constantly in charge.

Massnick Changes Corporate Name—The Massnick-Phipps Mfg. Co., Detroit, Mich., which makes motors, has changed its name to that of Massnick Mfg. Co.

Standard Welding Co. Makes Promotions—Following the resignation of H. A. Flagg, sales manager of the Standard Welding Co., and Charles E. Miller from the Detroit office of the same company, P. W. Gilbert, who has been assistant sales manager for nearly 5 years, becomes sales manager; B. A. Quayle, who has had charge of the Chicago office for many years, becomes general representative, with headquarters at the factory; Benton G. L. Dodge, who has had charge of advertising and publicity for more than 5 years, becomes manager of sales promotion.

Recent Incorporations

Birmingham, Ala.—Capitol Park Garage Co.; capital stock, $3,000; incorporators, G. W. Burbage, W. C. Kennedy and A. H. McCauley.

Buffalo, N. Y.—Becker-Hertzog Motor Co., Inc.; capital stock, $25,000; incorporators, A. Hertzog, A. E. Bocker and F. Bocker.

Brooklyn, N. Y.—Apex Tire and Rubber Co., to manufacture rubber tires, tubes, etc.; capital stock, $100,000; incorporators, Levi Helms, W. J. Pollock and J. A. McCarthey.

Cincinnati, O.—Economy Tire Co.; capital stock, $10,000; incorporators, W. J. McCauley.

Chicago, Ill.—Buena Motor Sales Co.; capital stock, $10,000; incorporators, George Sass, James H. Hood and Frederick J. Sass.

Cleveland, O.—Bottenfield Tire Co.; capital stock, $400,000; incorporators, S. T. Bottenfield, E. J. Speck, C. A. Myers, A. D. Howe and J. B. Kanner.

Cleveland, O.—Denoon Sales Co.; to sell motor car accessories; capital stock, $5,000; incorporators, I. N. Denoon, F. S. Jones, N. D. Sample, W. J. Streibinger and L. M. Knoll.

Chicago, Ill.—The Auto Dealers' Association, Inc.; capital stock, $2,500; incorporators, C. J. MacFadden, R. S. Tuthill, Jr. and F. P. Page.

Chicago, Ill.—Baker Motor Service Corp.; capital stock, $10,000; incorporators, F. D. Hieronumus, J. M. Arvey and M. D. Goodman.

Columbus, Ohio—Nessle Street Garage Co.; capital stock, $5,000; incorporators, A. H. Miller.

Columbus, Ohio—Economy Tire Co.; capital stock, $10,000; incorporator, W. J. McCauley.

Dover, Del.—The Alliance Tire and Rubber Co., Inc.; to manufacture motor car tires and supplies; capital stock, $2,500,000; incorporators, W. F O. Keefe, G. G. Steigler and E. E. Wright.

Denver, Colo.—The Auto-Gray Appliance and Chemical Co.; capital stock, $10,000; incorporators, C. O. Rice, F. M. Taylor, Jr., and F. P. Bertschy.

Indianapolis, Ind.—Permalite Corp., to deal in motor accessories; capital stock, $100,000; incorporators, E. C. Bacon, E. B. McNabb and H. L. Allen.

Indianapolis, Ind.—Hoosier Tire Co.; to buy and sell tires and accessories; capital stock, $10,000; incorporators, Eugene M. Fife, W. R. Fife and Evelyn H. Fife.

Jacksonville, Fla.—Strickland & Kuchler Motor Co., to make, buy, sell and care for motor vehicles; capital stock, $15,000; incorporators, J. E. Kuchler and J. S. Strickland.

Kansas City, Mo.—Delaware Garage Co., to operate a public garage and deal in motor cars and accessories; capital stock, $2,400; incorporators, H. R. Larrieu, E. C. Ruth and E. E. Bradshaw.

Knoxville, Tenn.—Cole Motor Sales Co.; to sell motor cars; capital stock, $25,000; incorporators, H. B. Lindsay, B. W. Lindsay, R. S. Young, S. E. Young and J. R Sedgwick.

Madison, Wis.—The International Garage Co.; capital stock, $3,000; incorporators, H. J. Lear, E. C. Droegkamp and E. A. Bartsch.

Memphis, Tenn.—Lockwood Auto Co.; capital stock, $5,000; incorporators, Robert Lockwood, C. B. Lockwood, William O'Halloran, G. C. Lockwood and T. J. Davis.

New York City—Automobile Securities Corp.; to deal in motor car accessories, etc.; capital stock, $100,000; incorporators, C. R. Allison, P. Lacroix and W. L. Glover.

New York City—International Motor Repair and Machine Co., Inc.; to deal in motor cars, machinery, accessories and fixtures; capital stock, $5,000; incorporators, H. Meyer, W. Schlotterback and H. Weiss.

New York, N. Y.—Dayton Tire Sales Co., Inc., to deal in rubber tires, tubes and motor car accessories; capital stock, $10,000; incorporators, B. C. Elliott, J. A. Pontolillio and E. R. Detable.

New York, N. Y.—The Automobile Salon, Inc., to exhibit, demonstrate and promote the sale of motor cars, advertising, etc.; capital stock, $25,000, incorporators, G. Alouzl, A. Engel and H. A. Holm.

New York, N. Y.—The Groton Auto Co., Inc., garage and repair shop; capital stock, $15,000; incorporators, W. F. De Witt, G. C. Begent and F. A. Begent.

Newark, N. J.—F. S. Motor and Garage Co., to manufacture, sell and deal in motor cars and to conduct a garage; capital stock, $5,000; incorporators, F. Seery, H. Lasher and Florence Newman.

Newark, N. J.—Orange Electric Garage, to deal in motor cars, motor cycles, wagons, etc.; capital stock, $50,000; incorporators, W. Carver, J. A. Savage, Jr. and A. E. McGeehan.

Nashville, Tenn.—Hirsig Auto and Supply Co., to engage in the motor car and supply business; capital stock, $25,000; incorporators, W. G. Hirsig, I. M. Hirsig, C. P. Healey, E. P. McBride and George A. Mull.

Omaha, Neb.—Dundee Garage Co.; capital stock, $6,000; incorporators, Cornelius, Rudolph and Theodora Lundgren.

Omaha, Neb.—Yellow Cab and Garage Co., to engage in motor car livery and repairing; capital stock, $10,000; incorporators, Frank Williams and J. H. Sutley.

St. Louis, Mo.—Denmo St. Louis Sales Co., to deal in motor cars and accessories; capital stock, $5,000; incorporators, C. Bruce Head, N. Falconer, Jr. and J. M. Berry.

Tazewell, Tenn.—J. S. Whiteaker Auto Co.; capital stock, $3,000; incorporators, J. S. Whiteaker, J. C. Buis, S. H. Douglass, K. M. Whiteaker and A. W. Whiteaker.

Toledo, O.—Nessle Street Garage Co.; capital stock, $5,000; incorporator, A. H. Miller.

Trenton, N. J.—Sykes Motor Co., Inc., to manufacture, repair and deal in motorcycles, bicycles, motor cars and sporting goods; capital stock, $25,000; incorporators, John Sykes, C. H. Beebe and A. W. Sykes.

Wilmington, Del.—Ben Hur New York Motor Co., to manufacture, sell and deal in and with bicycles, motor cars, etc.; capital stock, $300,000; incorporators, Ferris Giles, K. M. Dougherty and L. S. Dorsey.